

**English Test for Entrance Examination of Postgraduate Institute:(2 points for each question)**

**I. Please choose the fittest answer to complete the sentence in each question.**

- \_\_\_1. The student raced out of the classroom and bumped \_\_\_ a teacher who was carrying a cup of coffee.  
(A) into (B) at (C) to (D) on
- \_\_\_2. Ann says the party will be \_\_\_\_, so I suggest you wear a nice dress.  
(A) familiar (B) formal (C) fluent (D) funny
- \_\_\_3. Nancy gained four kilograms during the holidays, so she decided to go \_\_\_ a diet.  
(A) on (B) to (C) in (D) up
- \_\_\_4. Don't follow that car too \_\_\_\_. If it stops quickly, there could be an accident.  
(A) directly (B) exactly (C) nearly (D) closely
- \_\_\_5. After we ate the fried chicken, our fingers were oily, so we asked the waitress for more  
(A) napkins (B) packages (C) orders (D) menus
- \_\_\_6. The sea \_\_\_ seventy-five percent of the surface of our world.  
(A) making up (B) makes up (C) make up what is (D) which makes up
- \_\_\_7. A laser beam \_\_\_ a concentration of pure light.  
(A) consists of (B) which consists of (C) exhibiting (D) exhibit
- \_\_\_8. The universe \_\_\_ we know it might have begun with a great explosion.  
(A) as (B) that (C) and which (D) and
- \_\_\_9. The bus was full, but Judy saw an empty seat next to an old woman. "\_\_\_ I sit here?" she asked her.  
(A) Should (B) Would (C) May (D) Will
- \_\_\_10. Mr. Li teaches mathematics at a public high school in Kaohsiung. He \_\_\_ there since 1995.  
(A) is (B) was (C) will be (D) has been
- \_\_\_11. Being a newcomer, Alice is \_\_\_ with the area.  
(A) informative (B) unfamiliar (C) aware (D) confident
- \_\_\_12. Cars and motorcycles are \_\_\_ in this area; people can only walk around here.  
(A) permitted (B) promoted (C) banned (D) favored
- \_\_\_13. From the window, we got a(n) \_\_\_ view of the mountains.  
(A) breathtaking (B) chilly (C) excited (D) moral
- \_\_\_14. Despite losing the use of his legs and some use of his arms, the \_\_\_ boy managed to ski with the help of a special device.  
(A) shy (B) scared (C) disabled (D) elegant
- \_\_\_15. Jeff's English had improved so \_\_\_ that everyone was surprised.  
(A) gradually (B) critically (C) bitterly (D) dramatically
- \_\_\_16. The violent storm almost destroyed the area. People living there really \_\_\_ an ordeal.  
(A) scored (B) dragged (C) resisted (D) underwent
- \_\_\_17. \_\_\_ computer use may not cause wrist injuries, it can still give you a headache or make your eyes dry.  
(A) Once (B) When (C) While (D) Despite
- \_\_\_18. \_\_\_ he restrained himself from blurting out those hurtful words, his girlfriend would not have left.  
(A) Because (B) Had (C) Should (D) When
- \_\_\_19. Einstein was Jewish, and in 1933 the Nazi government \_\_\_ his property and German citizenship.  
(A) taken away (B) took away (C) has taken away (D) was taken away

20. The trash can, \_\_\_ with rejected term paper, sat in the corner of the dorm room.  
(A) fill (B) to fill (C) filling (D) filled
21. Sleep and exercise are \_\_\_ health.  
(A) in essence (B) essentially (C) essential to (D) essential for
22. He not only read the copy, but \_\_\_ on it.  
(A) reported (B) apologized (C) regretted (D) commented
23. Mr. Anderson says that in many ways he \_\_\_ his success to his wife's support.  
(A) owes (B) distributes (C) deceives (D) betrays
24. The spread of knowledge could be \_\_\_ by means of books.  
(A) accomplished (B) defined (C) claimed (D) exported
25. If you abide by your promise, you will keep your promise \_\_\_\_\_.  
(A) temporarily (B) periodically (C) permanently (D) unwillingly

**II. Please choose the item that interprets best the sentence in each question.**

26. Education has its fashion, and like all other fashions they come and go. This means that  
(A) Education should make us fashionable  
(B) Education is sometimes popular, sometimes unpopular  
(C) Students study and leave school after some time  
(D) Ideas on education change all the time
27. He isn't above lying when it suits his needs.  
(A) He will lie when he feels it's necessary.  
(B) He knows it is always necessary to tell the truth.  
(C) He never lies even when it would benefit him to do so  
(D) He usually lies down when he needs to rest.
28. People's interest in their health and their demand for various forms of medical care have enormously increased.  
(A) People are taking more interest in their health than in medical care.  
(B) People are taking more interest in their health but demanding less medical care.  
(C) People are taking more interest in their health and demanding much more medical care.  
(D) Medical care, drugs and hospital care grow more and more costly.
29. Primitive man was probably more concerned with fire as a source of warmth and as a means of cooking food than as a source of light.  
(A) In the ancient times fire was used for getting warmth and cooking food rather than for getting light.  
(B) Primitive man had nothing to do with light.  
(C) In the ancient times the main use of fire was not for getting warmth and cooking food but for getting light.  
(D) Primitive man regarded fire as the chief source of light.
30. A bookstore is the last place in the world I expect to meet you.  
(A) I finally find you in a bookstore.  
(B) If I want to meet you, I should go to a bookstore.  
(C) I met you in a bookstore last time.  
(D) It is impossible for us to meet in a bookstore.
31. Mr. Braun is a friend of mine whose profession is to advise or represent others in legal matters. Mr. Braun is  
(A) a judge (B) a lawyer (C) a policeman (D) a guide
32. For the American masses their civilization is a canned food civilization, so that the housewives, instead of being pressed by domestic chores, have plenty of time for reading and social activities, but on the other hand, people must be content with uniform and unpalatable dishes.  
(A) It seems that American housewives are pressed by the jobs of cooking and washing dishes, etc.  
(B) American housewives scarcely spend time visiting old friends or doing a lot of reading.  
(C) American housewives enjoy ready-made food very much.  
(D) It seems that Americans can't enjoy delicious food.

33. A general feature of modern society is the gap that separates the adult from the young, and it is most painfully felt between parents and children. In this paragraph, we are talking about the gap between \_\_\_\_.
- (A) families (B) society (C) parents (D) generations
34. One should read the classics in winter, because then one's mind is more concentrated; read history in summer, because one has more time; read ancient philosophers in autumn, because they have such charming ideas; and read the collected works of later authors in spring, because the Nature is coming back to life. What kind of reading requires most concentration?
- (A) History (B) Modern writing. (C) The classics. (D) Philosophy.
35. It may be said that the problem in adult education seems to be not the piling up of facts but practice in thinking.
- (A) Education methods for adults and young people should differ.  
(B) Adults do not seem to retain new facts.  
(C) Adults seem to think more than young people  
(D) Adult education should stress ability to think.

### III. Please choose the most proper item for each blank in the essays.

#### ESSAY 1

Jane lived near the sea, and she often went down to the beach to sit on the sand. Being by the sea was like being in a different 36. In front of her was the deep blue water; it slowly moved 37 her and then moved away again. Sometimes it came up very quickly and then her feet were covered by the salty water. 38 her, soft white clouds continually floated across the pretty blue sky. Noisy white 39 were flying over her head as well. 40 they dived down suddenly to catch a fish, and then they flew right back up into the air. Jane often sat by the sea for hours to enjoy this special place.

- \_\_\_ 36. (A) way (B) part (C) lake (D) world  
\_\_\_ 37. (A) for (B) with (C) toward (D) from  
\_\_\_ 38. (A) Above (B) Ahead (C) Besides (D) Next  
\_\_\_ 39. (A) sands (B) birds (C) clouds (D) ships  
\_\_\_ 40. (A) Sometimes (B) Although (C) When (D) If

#### ESSAY 2

Champ is a young male chimpanzee. Recently, he did something that surprised scientists. The scientists had 41 some grapefruit in the sand, and only Champ knew where the grapefruit was. When the other chimps were in the area, however, Champ 42 that he did not know where the grapefruit was. Later, when the other chimps 43 Champ went right to the spot 44 the grapefruit was hidden, dug it up, and ate it. 45, Champ was able to make plans and trick his friends.

- \_\_\_ 41. (A) buried (B) eaten (C) grown (D) dug  
\_\_\_ 42. (A) realized (B) pretended (C) wondered (D) admitted  
\_\_\_ 43. (A) fell asleep (B) fall asleep (C) will fall asleep (D) are going to fall asleep  
\_\_\_ 44. (A) which (B) there (C) what (D) where  
\_\_\_ 45. (A) To the scientists' relief (B) Amazingly (C) To make matters worse (D) However

#### ESSAY 3

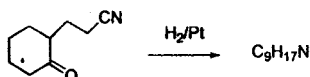
"Culture shock," according to specialists in intercultural studies, refers to the feelings which people 46 when they come into a new environment. 47 their studies, scientists have found that there are three stages of culture shock. In the first stage, the newcomers like their environment. Then, when the novelty 48, they begin to hate the people, the apartment, and everything 49 in their new environment. In the final stage of culture shock, the newcomers 50 their surroundings and, as a result, enjoy their life there.

- \_\_\_ 46. (A) experience (B) experiencing (C) experienced (D) to experience  
\_\_\_ 47. (A) Of (B) Despite (C) For (D) In  
\_\_\_ 48. (A) takes off (B) puts off (C) wears off (D) takes over  
\_\_\_ 49. (A) too (B) else (C) more (D) as  
\_\_\_ 50. (A) live with (B) appeal to (C) adjust to (D) escape from

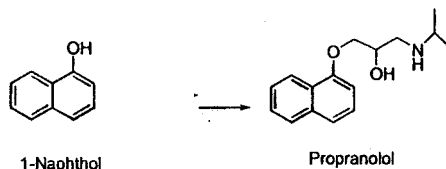
I. Draw structures corresponding to the following names: (15%)

- |  |                                  |
|--|----------------------------------|
| 1. <i>cis</i> -3- <i>tert</i> -Butylcyclohexancarbaldehyde | 2. Benzophenone                  |
| 3. 2,6-Dimethyloctane                                      | 4. Acetaminophen                 |
| 5. <i>trans</i> -1,3-Dichlorocycloheptane                  | 6. Oxalic acid                   |
| 7. Caprolactam   | 8. <i>N,N</i> -Dimethylbenzamide |
| 9. Phthalic anhydride                                      | 10. Imidazole                    |
| 11. <i>E</i> -4-Methyl-2-hexene                            | 12. Guanine                      |
| 13. Thymine  | 14. 2'-Deoxyribose               |
| 15. 1-Hepten-6-yne   |                                  |

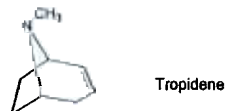
II. Propose a structure for the product with formula  $C_9H_{17}N$  that results when 2-(2-cyanoethyl)cyclohexanone is reduced catalytically. (5%)



III. How would you synthesize the beta-blocker, propranolol (inalderal) starting from 1-naphthol and any other reagents needed? (5%)



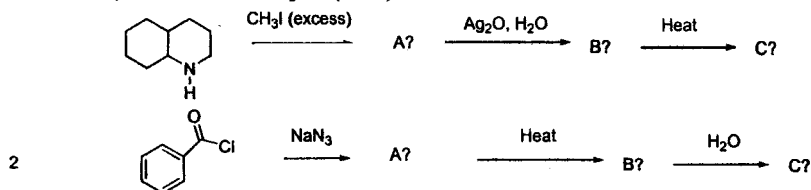
IV. Atropine,  $C_{17}H_{23}NO_3$ , is a poisonous alkaloid isolated from the leaves and roots of *Atropa belladonna*. On basic hydrolysis atropine yields tropic acid,  $C_6H_5CH(CH_2OH)COOH$ , and tropine,  $C_8H_{15}NO$ . Tropine is an optically inactive alcohol that yields tropidene on dehydration with  $H_2SO_4$ . Propose a structure for atropine. (5%)

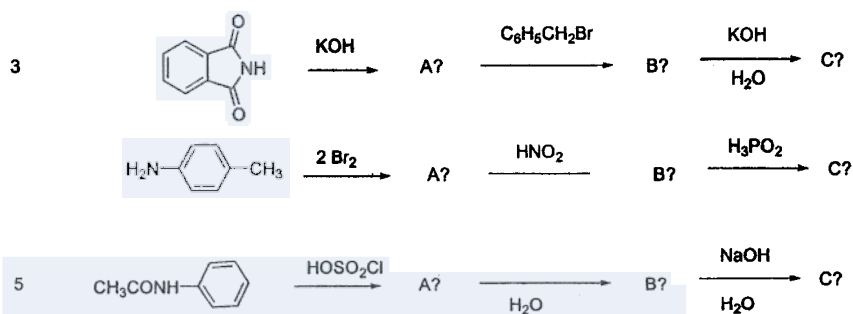


V. Give one reaction example or a general reaction to explain each of the following name reactions: (15%)

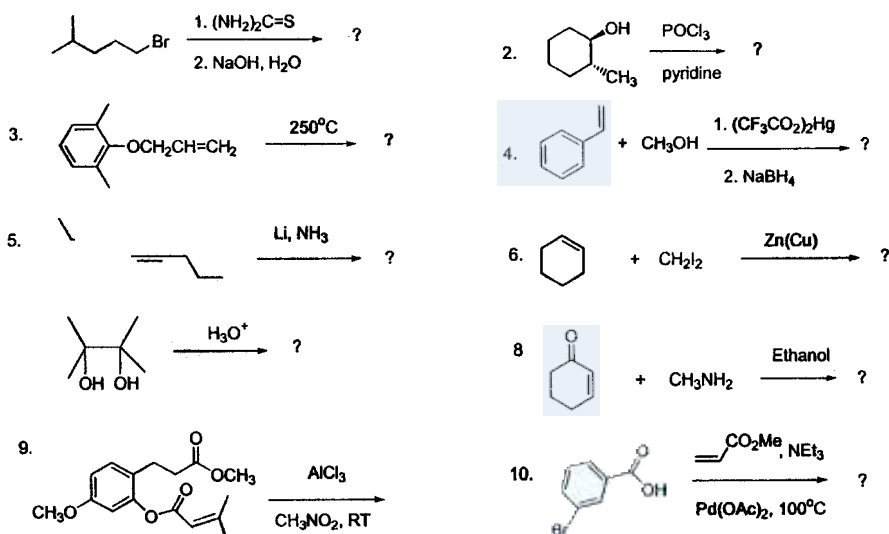
1. Suzuki coupling; 2. Swern oxidation; 3. Mitsunobu's reaction

VI. Predict the product(s) of the following reactions. If more than one product is formed, tell which is major. (15%)





VII. Predict the product of each of the following reactions: (20%)



VIII. How might you use mass spectrometry to distinguish between the following pairs of isomers (4%)

- 3-Methyl-2-hexanone and 4-methyl-2-hexanone
- 2-Methylpentanal and 3-methylpentanal

IX. Propose a structure consistent with the following spectral data for a compound

$C_8H_{18}O_2$ : (4%)

IR:  $3350\text{ cm}^{-1}$

$^1\text{H-NMR}$ :  $\delta$  1.24 (12H, s), 1.56 (4H, s), 1.95 (2H, s)

X. Propose a structure consistent with the following spectral data for a compound:

(4%)

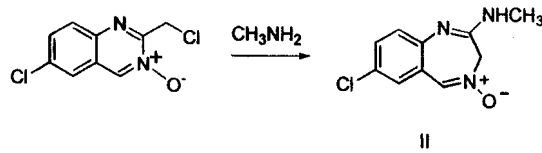
$M^+$ :  $m/z$  113

IR: 2270,  $1735\text{ cm}^{-1}$

$^1\text{H-NMR}$ :  $\delta$  1.30(3H, t), 3.50 (2H, s), 4.35 (2H, q)

$^{13}\text{C-NMR}$ : five different carbons in this compound.

- XI. Compound A,  $C_7H_{12}$ , was found to be optically active. On catalytic reduction over a palladium catalyst, 2 equivalents of hydrogen were absorbed, yielding compound B,  $C_7H_{16}$ . On ozonolysis of A, two fragments were obtained. One fragment was identified as acetic acid. The other fragment, compound C, was an optically active carboxylic acid,  $C_5H_{10}O_2$ . Write the reactions, and draw structures for compound A, B, and C. (4%)
- XII. Treatment of quinazoline (I) with methyl amine yields libruim (II). Propose a mechanism. (4%)



Describe the method of developing new drugs by bioactivity-guided fractionation from natural products. (15%)

2. Give the names of 10 natural anticancer drugs including their botanical origin and families, active constituents, and used parts. (20%)
3. Give example for each as the classification of the glycoside-containing drugs including their botanical origin, family names, active constituents, used parts and medical use. (25%)
4. Give the names of natural drugs containing the following constituents and their medical use: (20%)
  - 1) arecoline    (2) atropine    (3) physostigmine    (4) emetine
  - (5) hydrastine    (6) codeine    (7) chicoric acid    (8) anethole
  - (9) alliin    (10) aloin A
5. Give 10 commercial health food examples from natural products including their botanical origin, family names, active constituents, used parts and medical use. (20%)

解釋名詞 (10%)

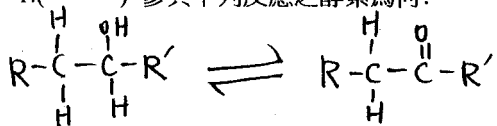
- A. Tm of membrane
- B. RNA i
- C. oxidative phosphorylation
- D. trans fatty acid
- E. liposome

解釋下列物質之功能,角色 (6%)

- F. shuttle vector
- G. SINEs
- H. Okazaki fragment

簡答題 (84%, 作答時專有名詞以英文書寫)

1. ( ) 參與下列反應之酵素為何?



- A) hydrolase
- B) dehydrogenase
- C) transferase
- D) ligase
- E) carboxylase

( ) 以何種 Vitamin 當作其 coenzyme? (4%)

- A) thiamine
- B) biotin
- C) lipoic acid
- D) niacin
- E) pyridoxine

2. 簡述代謝作用之調節酵素其可能的調控機轉 (6%)

3. 簡述常見的蛋白質二級結構(secondary structure) 又維持這些結構的主要鍵結為何? (5%)

4. 簡述人體內 amino acid 其 amino group 代謝並排出體外之途徑 (5%)

5. 何謂 prion? 正常 prion 與致病性 prion 分子上的差異為何? (4%)

6. 簡述膠原蛋白(collagen), 玻尿酸(hyanuronic acid)的結構及其特性 (5%)



7. 駱駝峰儲存大量 triacylglycerol 以氧化生成水與二氧化碳,並產生 ATP
  - A. 寫出此完全氧化過程所包括的代謝作用
  - B. 畫出 triacylglycerol 之結構 (7%)
8. 簡述飲食膽固醇(cholesterol)經腸道吸收至血液循環而進入肝臟的可能途徑若進入肝外組織則可能的途徑又為何? (6%)
9. 簡述高濃度 fructose 2,6-bisphosphate 對 phosphofructokinase-1 及 fructose 1,6-bisphosphatase 兩種酵素活性的影響又此情況之下,直接受其調控的代謝作用為何? (6%)
10. protein kinase 催化蛋白質磷酸化(protein phosphorylation,此反應可能於蛋白質的那些 amino acid 上進行? 並簡述一個包含 second messenger 及 protein phosphorylation 的訊息傳遞途徑(signal transduction pathway) (7%)
11. 寫出參與大腸桿菌(E.coli) mismatch pair 過程之蛋白質及酵素 (5%)
12. 寫出常見之 DNA binding domain 的種類 (5%)
13. 敘述 PCR 原理及步驟 (5%)
14. 寫出真核細胞(eukaryotes)RNA polymerase I, II, III 之作用 (5%)
15. 解釋生物體為何儲存肝醣(glycogen)或澱粉(starch)當作能量來源,而非儲存葡萄糖(glucose)? (5%)
16. 為何 ATP 可以當作細胞的能量貨幣(energy currency)? (4%)