

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 house wives, 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

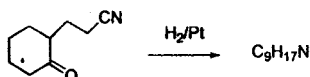
"Culture shock," according to specialists in intercultural studies, refers to the feelings which people 46 when they come into a new environment. 47 their studies, scientists have found that there are three stages of culture shock. In the first stage, the newcomers like their environment. Then, when 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

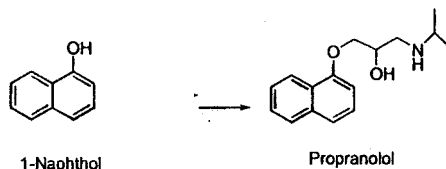
I. Draw structures corresponding to the following names: (15%)

- | | |
|--|----------------------------------|
| 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 | |

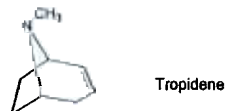
II. Propose a structure for the product with formula $C_9H_{17}N$ that results when 2-(2-cyanoethyl)cyclohexanone is reduced catalytically. (5%)



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



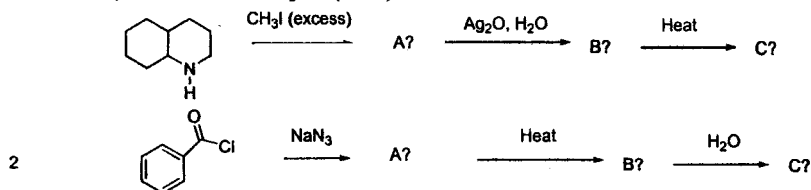
IV. Atropine, $C_{17}H_{23}NO_3$, is a poisonous alkaloid isolated from the leaves and roots of *Atropa belladonna*. On basic hydrolysis atropine yields tropic acid, $C_6H_5CH(CH_2OH)COOH$, and tropine, $C_8H_{15}NO$. Tropine is an optically inactive alcohol that yields tropidene on dehydration with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

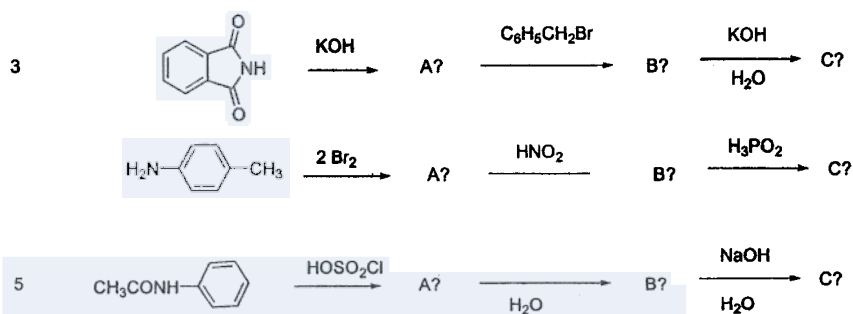


V. Give one reaction example or a general reaction to explain each of the following name reactions: (15%)

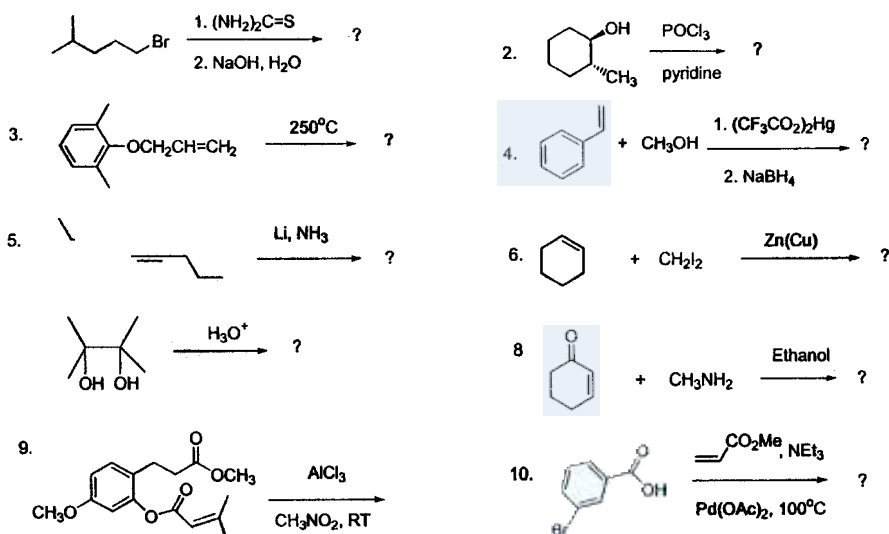
1. Suzuki coupling; 2. Swern oxidation; 3. Mitsunobu's reaction

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 cm^{-1}

$^1\text{H-NMR}$: δ 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%)

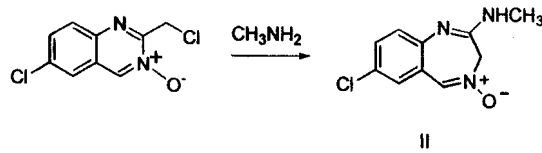
M^+ : m/z 113

IR: 2270, 1735 cm^{-1}

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

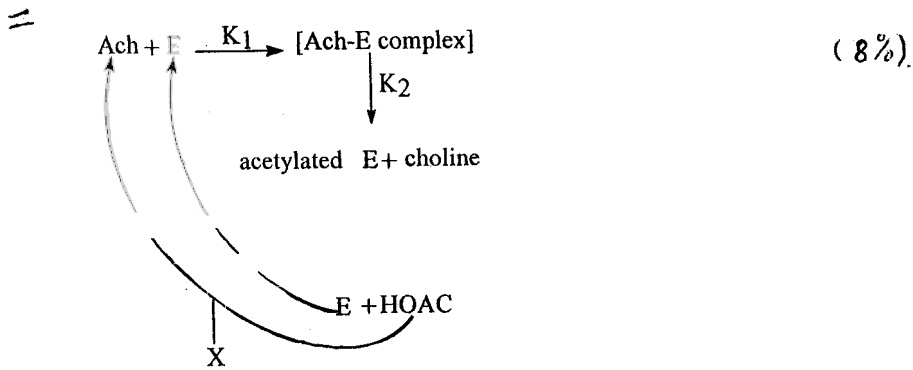
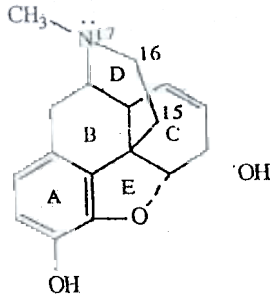
$^{13}\text{C-NMR}$: five different carbons in this compound.

- 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%)



一、試詳述 Morphine 的構造與活性之關係 (SAR)? (20%)

f



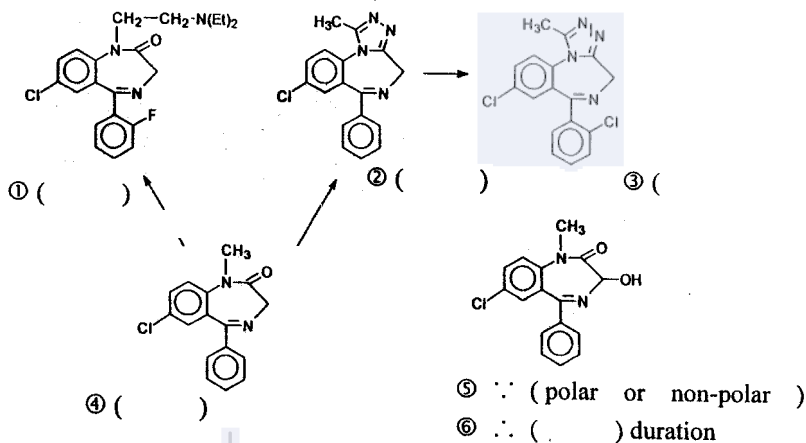
Ach=Acetylcholine

- 1) 三個速率常數中，何者與 affinity 有關?
- 2) $\text{HOAC} + \text{X} \rightarrow \text{Ach}$, X 之全名為何?
- 3) Parathion 之 K_3 值比 Ach 大或小? 原因何在?

三、從 A & B 群中選出適當之答案，填於答案紙處

(16%)

A 群



Chlorazepate

dipotassium,

⑦ itself (active or inactive)

⑧ ∴ () half-life.

↓ 脫水及 -CO₂

⑨ ()

∴ add 2' Cl in

(11) ∴ (↑ or ↓) activity

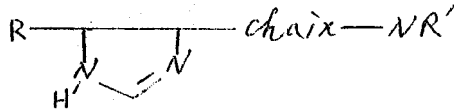
than ⑩.

B 群

- a、Nordazepam ; b、Flurazepam ; c、小白板 ; d、蝴蝶片
e、oxazepam ; f、Diazepam ; g、long ; h、short ; i、FM2

四、於冠狀血管擴張劑 Coronary Vasodilators 的鈣離子阻斷劑 Calcium antagonists, 請寫出三大類, 並舉例所代表之藥物? (12%)

詳述 H_2 antagonist 之 SAR? (20%)

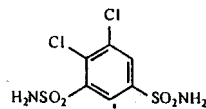


請寫出保鉀利尿劑 K^+ -sparing diuretics 之法定名及其所屬化學結構式之衍生物? (12%)

七

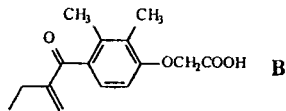
It has been shown that compound A is a potent carbonic anhydrase inhibitor.

(12%)



A

- Explain, with the aid of formula(s) or a diagram, how A exerts its diuretic action.
- Explain chemically, why compound B is NOT a carbonic anhydrase inhibitor?



- Assuming compound B also possesses potent diuretic properties, describe a possible mode of action.

說明下列分析有關名詞(40%)(每小題 4 分)

- | | |
|--|----------------------------------|
| 1. Lambert-Beer Law | 6. specific rotation |
| 2. bathochromic shift | 7. conjugate acid/conjugate base |
| 3. stoichiometric point | 8. chemical shift |
| 4. dichlorophenol-indophenol titration | 9. supercritical fluid |
| 5. gravimetric factor | 10. limit of quantitation |

層析分離法之管柱分離效率，常以 van Deemter 方程式($HETP = A + B/\mu + C\mu$)來評估，請說明方程式中有關各項之意義。(10%)

- 三. 計算 0.1 M sodium formate (K_a formic acid = 1.77×10^{-4}) 溶液之 pH 值(10%)
- 四. Sulfamerazine(美拉磺胺)($pK_a = 5.6$)溶於 pH 7.6 緩衝溶液中，則溶液中解離態 Sulfamerazine/非解離態 Sulfamerazine 之比例為何?(5%)
- 五 請敘述氣相層析法中電子捕獲型檢出器之檢出原理(5%)
- 六 維生素 A 醇(Retinol)，維生素 A 乙酸酯(Vitamin A acetate)，維生素 A 棕棕酸酯(Vitamin A palmitate) 以矽膠 (silica gel) 為固定相，二氯甲烷-己烷(30:70;v/v) 為展開溶劑作薄層分析，其 R_f 值大小排列為何?(5%)
- 七. 請就下列鍵結(bonding)之 stretching 對紅外光吸收之波數大小順位排列之。(a) C-C (b) C=C (c) C≡C (d) N-H (5%)
- 八. 請就下列四種化合物依極性大小順位排列之， A: $CH_3CH_2COCH_3$; B: $CH_3CH_2CH_2CH_3$; C: $CH_3CH_2CH_2COOH$; D: $CH_3CH_2CH_2CH_2OH$ (5%)
- 九 敘述微胞電動毛細管層析分析法(micellar electrokinetic capillary chromatography) (5%)
- 十 何謂 LC-MS-MS(5%)
- 十 某化合物(MW: 240)之溶液,其濃度為 $240 \mu g/ml$, 此溶液置於內徑 1cm cell 中, 測得其吸光度為 0.24,則其莫耳吸收係數(molar absorptivity)為多少?(5%)

1. 何謂 HLB (Hydrophile-Lipophile Balance)，並說明其在乳劑劑型設計及製備上之應用。(10%)
2. 欲製備適度凝聚化(controlled flocculation)的懸液劑(Suspension)，其配方應如何設計並說明其理由。(10%)
3. 何種特性之藥物適合於製備為持久釋出劑型(Extended-Release dosage form)，並述其有那些口服型態。(10%)
4. 試述注射劑之熱原試驗及其結果之評估。(10%)
5. 試述藥物經皮吸收之途徑及在劑型設計上如何促進藥物經皮吸收的方法。(10%)
6. 何謂臨界微膠粒濃度(Critical micelle concentration)及其測定方法，並說明其在助溶及乳化之應用。(10%)
7. 下列藥物是否發生交互作用，若有請述其原因及其適當處理方法。(20%)
 - ①. Aspirin-Antacids
 - ②. Phenytoin-Valproic acid
 - ③. Levodopa-Pyridoxine
 - ④. Ketoconazole-Antacids
8. 試述病人在何種狀態下才需要使用 TPN(Total Parenteral Nutrition)，並述其處方組成及調配時應注意事項。(10%)
9. 解釋名詞(10%)
 - ①. Plastic flow
 - ②. D-L-V-O theory
 - ③. Gold number
 - ④. Vanishing cream
 - ⑤. Optimization