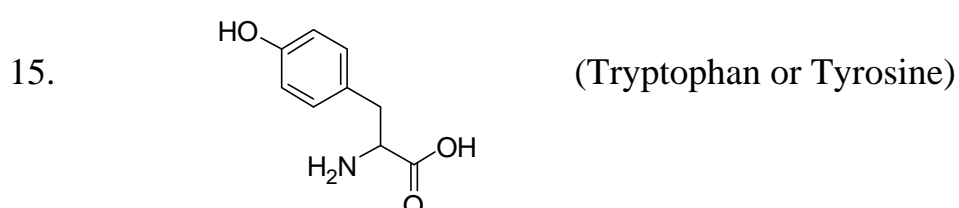
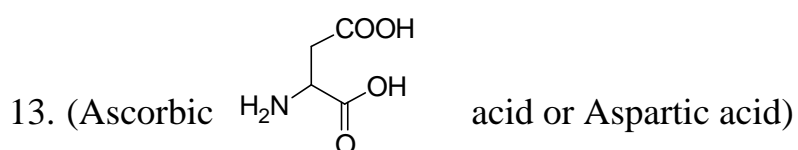
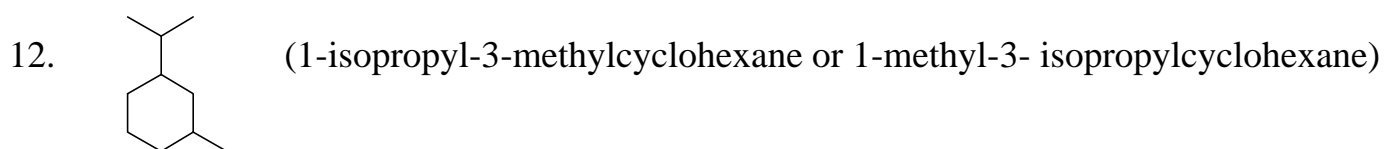


請務必於試卷紙上作答，違者該科不予計分。可攜帶工程用計算機，總分 100 分。

一、選擇題：請在括號選項中選出符合解釋或結構的答案(每題 3 分，共 45 分。)

**Example:** (Accuracy or Precision): The agreement of a particular value with true value.

1. (Functional group or Isotope effect): An atom or group of atoms in hydrocarbon derivatives that contains elements in addition to carbon and hydrogen.
2. (Crystal or Electrolyte): A material that dissolves in water to give a solution that conducts an electric current.
3. (Enantiomers or Stereoisomers): Isomers that are nonsuperimposable mirror images of each other.
4. (Denaturation or Flotation): The breaking down of the three-dimensional structure of a protein resulting in the loss of its function.
5. (Hybrid orbitals or Octet rule): The observation that atoms of nonmetals tend to form the most stable molecules when they are surrounded by eight electrons.
6. (Concentration cell or Fuel cell): A galvanic cell in which both compartments contain the same components, but at different concentrations.
7. (Isoelectronic ions or Spectator ions): Ions containing the same number of electrons.
8. (Coagulation or Colloid): A suspension of particles in a dispersing medium.
9. (Ostwald effect or Tyndall effect): The scattering of light by particles in a suspension.
10. (Brønsted-Lowery model or Lewis acid-base model): A model proposing that an acid is a proton donor, and a base is a proton acceptor.
11. (Silicon or Silicone): Polymers that include any inert, synthetic compound made up of repeating units of siloxane.



## 二、問答題 (共 40 分)

1. 請解釋何謂 Scientific models? (10 分)
2. 請解釋何謂 Solid、Liquid、和 Gas? (9 分)
3. 請舉出四種分離物質的方法及簡單說明其分離原理。(12 分)
4. 請解釋蛋白質的 primary, secondary 和 tertiary structures。(9 分)

## 三、計算題 (共 15 分)

1. 完成下列的算術運算，並以正確的有效數字表示答案:(每題 2 分，共 4 分)

(a)  $8.16 \times 5.1355 =$

(b)  $23 \div 275.15 =$

2. 柯丕欲配置 0.5 % (W/W)的美白成分 A 水溶液，請你幫他算一下該美白成分之莫耳濃度為何?

(美白成分 A 的 molar mass = 250 Da) (本題 5 分)

3. HLB 值(Hydrophile Lipophilic Balance) 是用來表示乳化劑親水或親油能力大小的值。當兩種乳化劑 (A 和 B) 被混合時，可以下列公式計算出混合物的新 HLB 值 ( $HLB_{AB}$ )，式中， $W_A$  和  $W_B$  分別表示乳化劑 A 和 B 的量， $HLB_A$  和  $HLB_B$  則分別是 A 和 B 的 HLB 值。

$$HLB_{AB} = (HLB_A \times W_A + HLB_B \times W_B) / (W_A + W_B)$$

某日花媽想要以 Span 80 (HLB=4.3)和 Tween 80 (HLB=15.0)配置出 HLB 值為 12.0 的劑型，請問她需要取用兩者的百分比各為何?(本題 6 分)

(試題結束)

請務必於試卷紙上作答，違者該科不予計分。

I. Vocabulary: Choose the answer that best matches the meaning of each bold word or phrase (20%)

- Horticultural societies have **extensive** knowledge of how to grow crops. This knowledge allows them to successfully provide food for their people every year.  
A. narrow            B. wide-ranging            C. conditional            D. costly
- Ancient African empires such as Ghana were **vulnerable** to external attack as well as internal rebellion, and the oral and written histories of this region record the rise and fall of several large kingdoms.  
A. secure            B. guarded            C. affable            D. susceptible
- One of the most disturbing phenomena is that sometimes suicides suddenly occur in **clusters**; that is, one child kills himself or herself, then another child does the same in a nearby house or town, and then another.  
A. bunches            B. individuals            C. pairs            D. fractions
- Although elderly people may have to deal with dying and death, they are generally less **morbid** about it than are adolescents. In one study, the oldest group expressed the least fear of death, some even saying they were eager for it.  
A. mirthful            B. enthusiastic            C. affected            D. dedicated
- More recently, the Internet has **dramatically** expanded opportunities for people to meet and develop relationships through social networks, online dating services, e-mail, chat rooms and news groups.  
A. greatly            B. trivially            C. sporadically            D. occasionally
- This agreement shall continue on a “month to month” basis **commencing** on March 1<sup>st</sup>, 2015 and continuing until either side gives 30 days written notice to terminate.  
A. trading            B. beginning            C. reviewing            D. bargaining
- Salman Rushdie’s *Midnight’s Children* is a book about India’s transition from British colonialism to independence. The story is set in the **context** of actual historical events before and after the independence and partition of India, which took place in 1947.  
A. background            B. effect            C. connection            D. quandary
- Many have questioned the value of the IQ score as a measure of intelligence. Tests have been shown to be culturally **biased** toward Western culture and white, middle-class men.  
A. prejudiced            B. emphatic            C. impartial            D. adjuvant
- In one of Jordan’s largest demonstrations in years, thousands of people Friday shouted support for airstrikes against the Islamic State as the country’s leaders rapidly **escalated** their offensive against the militants.  
A. diminished            B. intensified            C. condemned            D. castigated
- Culture can be seen as a system of shared beliefs, values, customs, and behaviors **prevalent** in a society and that are transmitted from generation to generation.  
A. subservient            B. uncommon            C. exclusive            D. widespread

**II. Sentence Completion: Choose the word that best completes the sentence (14%)**

11. Although the Red Cross was started by a Swiss citizen and its headquarters are in Geneva, the organization has no official ties to Switzerland. It is not \_\_\_\_\_ to the United Nation, either.  
A. obliged      B. engaged      C. indebted      D. related
12. His idea is met with \_\_\_\_\_ and controversy. Some people thought his belief was counterintuitive, going against a natural way of thinking.  
A. acclamation    B. laudation      C. skepticism      D. jubilation
13. Under the Electronic Communication Privacy Act (ECPA), an employer cannot \_\_\_\_\_ an employee's personal phone calls.  
A. plagiarize      B. eavesdrop on    C. look after      D. confiscate
14. Westerners used to \_\_\_\_\_ fengshui as mere superstition, but today more and more Western architects, real estate developers, and interior designers are using the principle of the Chinese practice of fengshui in their life and work.  
A. cherish      B. frown upon      C. appreciate      D. dispose of
15. Some people think that education is the most important \_\_\_\_\_ for government spending. Other people believe that things like health and transport are equally important.  
A. priority      B. antiquity      C. strategy      D. foundation
16. In the past, mobile phones did not offer deaf people much help except for the ability to communicate by text message. But now video-phone technology has meant a(n) \_\_\_\_\_ in the quality of life deaf people.  
A. adjustment    B. stagnation      C. deterioration    D. improvement
17. It is possible that laptops and computers will disappear in the future to be \_\_\_\_\_ with touch screens that are thinner than paper.  
A. replaced      B. exchanged      C. combined      D. integrated

**III. Written Expression: Identify the underlined word or phrase that must be changed in order for the sentence to be correct (16%)**

18. Biometrics (A)refer to a method of personal identification (B)based on unique (C)characteristics such as face recognition, fingerprint readings, or retina (D)scanning.
19. The Impressionist (A)painters painted everyday scenes from the world we know rather than (B)following traditional (C)religion, historical, or mythological (D)subjects.
20. When you prepare (A)for a test, you need to pay close attention to (B)understand key terms and main ideas. If you have (C)highlighted these in the text, pay careful attention to those parts (D)as you review it.
21. Today, it (A) recognizes that anyone, not just soldiers, may suffer (B)from post-traumatic stress disorder (PTSD) after (C)experiencing or (D)witnessing a horrific and violent event. (Academic Encounters 2e, 20)
22. In 1964, Canada was the first country in the world to (A)require that warning label (B) appears on every cigarette pack (C)sold. Since the time, most countries in the world (D)have done the same.

23. United States President Barack Obama has (A) angry China after (B) warmly acknowledging the Dalai Lama at a national prayer breakfast in Washington. Obama did not meet directly with the Dalai Lama at the event on Thursday, but China said that it (C) was opposed to any foreign countries (D) receiving him as a guest.
24. The digital divide can be (A) defined as the gap between those who have access to technology of any kind and those who do not. It is a (B) phenomena that has been growing particularly (C) since the arrival of the internet in the 1990s, which has led to this form of new (D) inequality.
25. Chinese-American historian Yu Ying-shih, (A) an outspoken critic of the Chinese government, said Taiwan's (B) democratization process has great (C) significant in Chinese history because China's dynastic changes and power shifts have always been compelled (D) by military force.

**IV. Cloze Test: Choose the best answer for each missing word or phrase in the following passages (20%)**

Your Majesties, Your Highnesses, Distinguished Guests, Comrades and friends: Today, all of us do, by our presence here, and by our celebrations in other parts of our country and the world, confer glory and hope to newborn liberty. Out of the experience of an extraordinary human disaster that lasted too long, must be born a society of which all humanity will be (26) .

Our daily deeds as ordinary South Africans must produce an actual South African reality that will reinforce humanity's belief in justice, (27) its confidence in the nobility of the human soul and sustain all our hopes for a glorious life for all. All this we owe both to ourselves and to the peoples of the world who are so well represented here today.

We have, at last, achieved our political emancipation. We pledge ourselves to liberate all our people from the continuing bondage of poverty, deprivation, (28), gender and other discrimination.

We succeeded to take our last steps to freedom in conditions of relative peace. We commit ourselves to the construction of a complete, just and (29) peace. We have triumphed in the effort to implant hope in the breasts of the millions of our people. We enter into a covenant that we shall build the society in which all South Africans, both black and white, will be able to walk tall, without any fear in their hearts, assured of their inalienable right to human dignity--a rainbow nation (30) peace with itself and the world. (Source: The inaugural speech by Nelson Mandela in 1994)

26. A. ashamed      B. proud      C. worried      D. pompous
27. A. strengthen      B. add      C. impinge      D. undermine
28. A. suffer      B. to suffer      C. suffered      D. suffering
29. A. last      B. lasting      C. lasted      D. to be lasted
30. A. at      B. on      C. in      D. of

Guess what the largest lizard in the world is? It is the Komodo dragon! An adult Komodo dragon can reach up to 10 feet in length and be over 300 pounds in weight. This monster lizard exists only on a few Indonesian islands, including Komodo, its namesake island. The (31) of the animal's living environment is thought to have contributed to its unusual size, as no other predators are large enough to (32) with it. The Komodo dragon feeds mainly (33) dead animals, but it also hunts large prey such as goats and deer. And adult dragon is so powerful that it can take down prey much larger than itself, such as water buffalo. It is estimated that currently there exist less than 6,000 wild Komodo dragons in the world. The loss of (34) due to human development has threatened the survival of this giant lizard. Another factor is poaching activities, which has deprived the dragon of some of its food sources. More (35) needs to be made to prevent this unique animal from extinction. (Source: *English for Life and Work*, 2011)

31. A. overcrowding      B. specification      C. regulation      D. isolation
32. A. befriend      B. cooperate      C. compete      D. encounter
33. A. in      B. on      C. of      D. at
34. A. habitualness      B. habitat      C. conservation      D. confinement
35. A. devastation      B. exploitation      C. effort      D. utilization

**V. Reading Comprehension: Choose the best answers to the following questions (30%)**

Scientists already knew that bilingual young adults and children perform better on tasks dictated by the brain's executive control system. Located at the front of the brain, this system is "the basis for your ability to think in complex ways, control attention, and do everything we think of as uniquely human thought," said Ellen Bialystok, a psychologist at York University in Toronto, Canada. Now studies are revealing that advantages of bilingualism persist into old age, even as the brain's sharpness naturally declines, Bialystok said Friday at a meeting of the American Association for the Advancement of Science in Washington, D.C.

Bialystok and colleagues examined 102 longtime bilingual and 109 monolingual Alzheimer's patients who had the same level of mental **acuity**. About 24 million people have dementia worldwide, with the majority of them suffering from Alzheimer's, according to Sweden's Karolinska Institutet medical university. The bilingual patients had been diagnosed with the Alzheimer's about four years later than the monolingual patients, on average, according to Bialystok's most recent study, published in November in the journal *Neurology*. This suggests bilingualism is "protecting older adults, even as Alzheimer's is beginning to affect cognitive function," Bialystok said.

Bialystok is also studying physical differences between bilingual and monolingual brains. In a new experiment, she used CT scans to examine brains of monolinguals and bilinguals with dementia. All the subjects were the same age and functioned at the same cognitive level. The physical effects of the disease in the brain were found to be more advanced in the bilinguals' brains, even though their mental ability was roughly the same, Bialystok told National Geographic News. Apparently, the bilinguals' brains are somehow compensating, she said. "Even though the 'machine' is more broken, they can function at the same level as a monolingual with less disease," she said.

"If we want to learn a second language, [we need to] set time aside to allow that to happen—and evidence suggests the payoff is worth it. Even if you don't learn a second language until after middle age, it can still help stave off dementia," York's Bialystok said. Being "bilingual is one way to keep your brain active—it's part of the cognitive-reserve approach to brain fitness," Bialystok said. And when it comes to exercising the brain by learning another language, she added, "the more the better—and every little bit helps." (Source: "To Stave Off Alzheimer's, Learn a Language?" *National Geographic News*, February 18, 2011)

36. Which of the following statements best summarizes the main idea of the article?
- A. Alzheimer disease and dementia affect the brain differently
- B. Bilingual brains can delay aging effects
- C. The executive control system in the brain controls our language ability
- D. Bilingual's brain is susceptible to Alzheimer disease
37. Which of the following statements is NOT true?
- A. Ellen Bialystok's research involved human subjects
- B. Ellen Bialystok's bilingual and monolingual patients had been diagnosed with the Alzheimer's about the same time.
- C. All of Ellen Bialystok's patients were the same age
- D. None of the above
38. The word **acuity** is closest in meaning to \_\_\_\_\_.
- A. sharpness      B. ineptness      C. misinterpretation      D. maturity

39. According to Ellen Bialystock, learning a second language is beneficial to our brains\_\_\_\_\_
- A. if we do it after middle age
  - B. only when we are diagnosed with Alzheimer disease
  - C. because it can help defend the attack of Alzheimer
  - D. because we are able to control our attention

The protests taking place in the heart of Hong Kong, Asia's most prominent financial center, present what some commentators consider the biggest challenge to Beijing since the 1989 Tiananmen protests. For two consecutive nights, protesters have massed in some of the city's busiest areas and refused to budge despite police firing multiple rounds of tear gas to disperse the crowds.

The immediate impetus for the demonstrations is new measures proposed by China's authorities that would limit who Hong Kongers can elect in 2017 elections. But the political earthquake shaking the former British colony is centered on a far deeper fault line: the struggle for freedom and democracy in China and the ability for Beijing's authoritarian rulers to cope with the aspirations of 7 million Hong Kongers. Here's what you need to know.

Hong Kong, which comprises a number of islands and a coastal strip east of southern China's Pearl River Delta, was a British colony for more than a century and a half before a negotiated deal between London and Beijing handed the territory over to China in 1997. It became a "Special Administrative Region" (SAR) of China under a unique set of conditions, dubbed "one country, two systems": Hong Kongers were granted a range of freedoms far greater than what is allowed on the Chinese mainland. The city maintains its own immigration and customs policy, its own police force, courts and laws, modeled in part on what existed in colonial times. The British also extracted a somewhat nebulous guarantee from the Chinese that Hong Kong would be permitted a "high degree of autonomy" for 50 years after its return to China.

Despite the fears of many doom-mongers, Hong Kong after 1997 remained much the same as Hong Kong before the handover. It was administered by China but with a long leash: Hong Kongers commemorate the June 4 anniversary of the Tiananmen protests every year with mass vigils and marches. Freedom of press and assembly has been preserved, and the city still gets top marks in the region for its rule of law and protection of human rights. Hong Kong has something of a democratic political system, with myriad political parties taking up seats in a legislative assembly that, while beholden to Beijing's interests, is not wholly cowed by them.

But in recent years, Hong Kongers have grown increasingly concerned with China's long shadow and fear that Beijing will steadily undermine the SAR's unique freedoms and dismantle the "one country, two systems" model. Recent protests have highlighted attacks on Hong Kong's freedom of speech as well as the growing influx and influence of mainlanders in the territory. Hong Kongers, many of whom are first- or second-generation descendants of Chinese who fled Communist rule, see themselves in some respects as a people apart from the rest of China. It all came to a head earlier this month when Beijing announced that Hong Kong's next leader, known as the chief executive, would come only from a slate of candidates **vetted** by Chinese authorities ahead of planned elections in 2017.

40. Which of the following is NOT true about Hong Kong?
- A. It has been permitted a high degree of autonomy by the Chinese government until 2047
  - B. It was a British colony for over 150 years
  - C. It can maintain its own courts and laws after the handover in 1997
  - D. None of the above
41. According to the article, which of the following is unlikely to be Hong Kongers' nightmare?
- A. They are not allowed to elect their own chief executive
  - B. Their human rights are not protected by the rule of law
  - C. The freedom of press is controlled by the Chinese authority
  - D. They can no longer make Kung-fu movies

42. The word **vett**ed is closest in meaning to\_\_\_\_\_.

- A. examined carefully      B. overlooked      C. evaded      D. annoyed excessively

The protests have involved a convergence of various movements: the organizers who launched “Occupy Central,” Hong Kong's (in many ways more successful) equivalent of the U.S. Occupy Wall Street movement, which was directed as much at the city's own business elites as it was at Beijing; Hong Kong's traditional pro-democracy groups, including many that are active during annual June 4 protests; and a huge outpouring of university and high school students, **galvanized** by the arrest on Friday of a 17-year-old student leader. They are calling for the resignation of Hong Kong's current chief executive, Leung Chun-ying, considered by critics to be a Beijing proxy, and want to see free, direct elections allowed in the territory. They say they plan to press these demands through peaceful civil disobedience. The protests have been marked by propriety and peacefulness, with activists recycling trash in the middle of demonstrations and school kids dutifully doing their homework while conducting a sit-in.

Awkwardly. China's state media censored news of the protests, while authorities also blocked access to social media sites such as Instagram, on which Hong Kong protest hashtags were trending. They also condemned the "unlawful occupation actions" taking place in Hong Kong and suggested a foreign hand was guiding radicals mobilizing in the streets. Leung has branded the protests "illegal" and urged Hong Kongers to engage in "rational" dialogue with their local government.

The protests appear to be growing. Wednesday and Thursday mark a national holiday in China, and many expect what takes place on those days to define the current unrest. If the sit-ins and demonstrations continue with the intensity they've already shown, there's a chance that local security forces could crack down more violently than they have so far, including perhaps using rubber bullets. That sort of violent response could be a disaster for Hong Kong's government, which would face mounting pressure from the territory's voluble civil society and media.

For China's rulers, the choices seem more clear. They've already signaled their lack of interest in allowing a true democracy to flourish in Hong Kong. State media in the past have pointed to the arrogance and "racism" of Hong Kong's anti-Chinese activists; an influential Chinese commentator notoriously labeled Hong Kongers "dogs of British imperialists." China is unlikely to allow the protesters to win many concessions.

(Source: “Why Hong Kong’s protests are a very big deal?” *The Washington Post*, September 29, 2014)

43. The word **galvanized** is closest in meaning to \_\_\_\_\_.

- A. pacified      B. proctored      C. stimulated      D. dissuaded

44. Which of the following statements does NOT describe the protest in Hong Kong?

- A. It was a demand for free and direct elections  
B. Pro-democracy groups joined students for the Occupy Center action  
C. The leader of the protest is a Beijing proxy  
D. It was a peaceful civil disobedience protest

45. According to the article, how did the Chinese authorities react to the protest?

- A. They pulled Google search engine out of China  
B. They forced Hong Kong police to crack down on the protestors with rubber bullets.  
C. They made concessions and guaranteed a true democracy in Hong Kong  
D. They condemned the action and claimed that it was motivated by foreigners.

**A** six-month-old giant panda has been unveiled to the public in Taiwan, with long lines queued up at the Taipei City Zoo to see the cub cavorting around her cage with her protective mother. Yuan Zai's debut had long been anticipated on the island of 23 million people. With delighted visitors passing in front of her cage at the rate of 40 per minute, Yuan Zai showed off her climbing skills before retreating to mother Yuan Yuan's embrace and then heading off for a nap. She currently sleeps 20 hours a day.



Zoo officials say they will be able to accommodate 19,000 visitors a day to see Yuan Zai, whose mother and father came to Taiwan from China in late 2008. Their arrival was seen at the time as a high water mark in Beijing's use of "soft power" in Taiwan, which split from the mainland amid civil war in 1949 and remains the object of unwavering Chinese attempts – occasionally backed by **sabre-rattling** – to bring it back into the fold. Politics seemed to be about the last thing on the minds of Yuan Zai's fan base on Monday as again and again visitors' faces lit up with broad smiles amid giggles of **glee** and repeated cries of "how cute" or "how beautiful".

Chinese giant pandas have been a hit all around the world but seem to have a special cachet in Taiwan, where animal figures are so much in vogue that the airline company Eva Airways has found that festooning its aircraft in the livery of fictional Japanese figure Hello Kitty provides a powerful boost to sales. (Source: "Taiwan Panda Cub Greet Public at Taipei Zoo," *The Guardian*, Jan.06, 2014)

46. Which of the following is NOT mentioned in the article?

- A. The fan of the panda cub
- B. The age of the panda cub
- C. The diet of the panda cub
- D. The parents of the panda cub

47. Sabre-rattling mentioned in the article refers to China's \_\_\_\_\_ Taiwan.

- A. separation from
- B. political ties with
- C. threat to use military power against
- D. civil war with

48. Which of the following statements is NOT true?

- A. Yuan Zai has a protective mother
- B. Less than 20 thousand visitors are allowed to see Yuan Zai in a day
- C. Yuan Zai's parents were born and raised in Taiwan
- D. Yuan Zai's fans have little concern for politics when they go to visit her at the zoo.

49. The word **glee** is closest in meaning to \_\_\_\_\_.

- A. ambivalence
- B. complacency
- C. gloom
- D. joviality

50. According to the article, the Hello Kitty Eva airplane points to the fact that\_\_\_\_\_.

- A. the image of Yuan Zai is not allowed to be painted on the body of the Eva airplane
- B. Hello Kitty enjoys as much popularity as Yuan Zai does
- C. Yuan Zai is well-loved in Taiwan
- D. Taiwanese people are fascinated by animal figures