

Part I. Question 1 to 10, please choose the answer closest to the underlined word or phrase. Question 11 to 15, please choose the answer that best completes the sentence. One Answer Only. 2 points.

1. Some of the **potential** dangers to cows treated with synthetic bovine growth hormone were brought into light through the effort of some scientist.
(A) related (B) possible (C) certain (D) obvious
2. As more U.S workers spend their days at keyboards, hand injuries and lawsuits are **multiplying**.
(A) increasing (B) minimizing (C) boundary-crossing (D) profit-making
3. There are several **bodies** that match volunteers with voluntary groups, including the National Volunteering Centre.
(A) organizations (B) remains (C) people (D) motivations
4. Piaget believed that we go through four stages in understanding the world. Each of the stages is age-related and consists of **distinct** ways of thinking.
(A) new (B) simple (C) different (D) exact
5. Some people think that spoken language is **transient** but writing tends to last because of its physical medium (characters on some surface).
(A) unimportant (B) temporary (C) interesting (D) clear
6. But what most prevents women from reaching the boardroom, say bosses and headhunters, is lack of **hands-on** experience of a firm's core business.
(A) significant (B) available (C) tested (D) practical
7. Manufactured in the **tranquil** New England town of Concord, New Hampshire, the famous Concord Coach came to symbolize the Wild West.
(A) peaceful (B) bustling (C) industrial (D) tiny
8. With oil prices shooting up, the demand for big cars is **dwindling**. Now compact cars are on great demand.
(A) depressing (B) surpassing (C) decreasing (D) swirling
9. All of this she conferred on me without ever **setting foot in** the kitchen of her house.
(A) leaving (B) dressing (C) entering (D) preparing
10. In choosing your career, you should follow your heart, but you also need to be **rational**.
(A) making decisions based on intelligent thinking (B) making decisions using strong emotion of feeling
(C) making decisions because of relationships (D) making decision because of profits
11. _____ abolishing death penalty is a global trend, the public is so polarized over the issue that it requires more discussion.
(A) Because (B) Whereas (C) Although (D) In addition to
12. Women now often work areas _____ medicine, business management and higher education, which would not have been possible 100 years ago.
(A) regardless of (B) in virtue of (C) due to (D) such as
13. Both the National Cancer Institute and the World Health Organization say there isn't evidence to support the assertion that cell phones are a _____ threat.
(A) health public (B) healthy public (C) public-health (D) publically health
14. _____ on barren slopes can help prevent erosion.
(A) Planting trees (B) For trees to be planted (C) In order to plant trees (D) Trees are planted
15. Almost four in five people around the world believe that _____, a poll for the BBC World Service suggests.
(A) access the Internet is a fundamental right (B) that access to the Internet is a fundamental right
(C) fundamental right accessing the Internet is (D) the fundamental right is access the Internet

II. Question 16 to 25, please choose the best answer to fill each of the numbered blanks in the passages. 2 points each.

People communicate in many different ways and yawning is one important means of 16 communication. It gives many different 17 to people and everyone yawns. Some birds, reptiles, fish and most mammals also yawn. However, the reason why we do it is still a mystery. There is also very little research available on yawning as for most people, it is not a problematic 18. Here are a few things that are known about yawns: 1.) The 19 duration of a yawn is about six seconds; 2.) in humans, the 20 yawn happens about eleven weeks after conception; 3.) Yawns become contagious to people between the first and second years of life.

16. (A) audio (B) friendly (C) non-verbal (D) scenario
 17. (A) messages (B) funs (C) challenges (D) experiments
 18. (A) resistance (B) repeat (C) reflex (D) rejection
 19. (A) critical (B) analytical (C) terminal (D) average
 20. (A) most difficult (B) earliest (C) most fundamental (D) experiential

Culture shock can be an excellent lesson 21 human differences. The reason culture shock occurs is that we are not prepared for these differences. 22 the way we are taught in our culture, we are all ethnocentric. This term comes from the Greek root ethnos, 23 a people or group. Thus, it refers to 24 our outlook or world view is centered on our own way of life. Ethnocentrism is the belief that one's own patterns of behavior are the best: the most natural, beautiful, right, or important. Therefore, other people, 25 that they live differently, live by standards that are inhuman, irrational, unnatural, or wrong.

21. (A) on relative values and understanding (B) in relative values and in understanding
 (C) about relating values and on understanding (D) by means of relative values and understanding
 22. (A) Because of (B) Because (C) In the event of (D) In spite of
 23. (A) it means (B) it is meaning (C) meaning (D) by meaning
 24. (A) that the fact (B) the fact that (C) the fact (D) the fact that is
 25. (A) to the extend (B) by and large (C) more or less (D) drawing a line

III. Reading Comprehension. In this part, you will read several passages. Each one is followed by a number of questions. Question 26 to 40, you should choose the ONE best answer to each question. 2 points each.

Dariusz Leszczynski, a research professor at Finland's Radiation and Nuclear Safety Authority in Helsinki, has done studies indicating that radio frequency radiation may create a stress reaction in the cells that line blood vessels, leading to a dangerous breach in the blood-brain barrier. "Mobile-phone radiation may be able to indirectly hurt cells, perhaps by interfering with their ability to repair normal DNA damage," he says. "Given the scientific uncertainty, it's premature to say the use of cell phones is safe."

If radio frequency radiation increases the chances of developing brain cancer, it should show up in long-term studies of cell-phone users. But many epidemiological studies have found no clear connection, including a 2007 Danish Cancer Society study of 421,000 cell-phone users, which led many in the media to conclude that mobiles are harmless. To date, "peer-reviewed scientific evidence has overwhelmingly indicated that wireless

devices do not pose a risk," says John Walls, a spokesman for CTIA, a global wireless association.

26. According to Prof. Dariusz Leszczynski,
- (A) whether or not the use of cell phones is safe is still uncertain.
 - (B) it is proved that cell phone would impair normal DNA.
 - (C) Using cell phones will block blood vessels.
 - (D) The research on cell phones is not reliable.
27. The passage following these two passages might be about
- (A) the autobiography of Dariusz Leszczynski.
 - (B) problems with many of these studies.
 - (C) the development of brain cancer.
 - (D) peer review of cell phones.

While fats have lately acquired a bad image, one should not forget how essential they are. Fats provide the body's best means of storing energy, a far more efficient energy sources than either carbohydrates or proteins. They act as insulation against cold, as cushioning for the internal organs, and as lubricants. Without fats, energy would have no way to utilize fat-soluble vitamins. Furthermore, some fats contain fatty acids that contain necessary growth factors and help with the digestion of other food.

An important consideration of fat intake is the ratio of saturated fats to unsaturated fats. Saturated fats, which are derived from dairy products, animal fats, and tropical oils, increase amount of cholesterol in the blood. Cholesterol may lead to coronary heart disease by building up in the arteries of the heart. However, unsaturated fats, derived from vegetable oils, tend to lower serum cholesterol if taken in a proportion twice that of saturated fats.

The consumption of a variety of fats is necessary, but the intake of too much fat may lead to a variety of health problems. Excessive intake of fats, like all nutritional excesses, is to be avoided.

28. Comparing with carbohydrates or proteins, fats
- (A) store food more efficiently.
 - (B) deserve their bad image.
 - (C) consume more oils.
 - (D) provide more fluids.
- Which of the followings is the main idea of
29. The main idea of the third paragraph is that
- (A) people are eating less and less fat today.
 - (B) fats should be eliminated.
 - (C) excessive consumption of fats may be dangerous to one's health.
 - (D) fats taken in the proper proportion may reduce serum cholesterol.
30. With which of the following is the whole passage primarily concerned?
- (A) The role of fats in human health
 - (B) The dangers of cholesterol
 - (C) The benefits of fats in the diet
 - (D) The importance of good nutrition

Gender Equity

(1) In the past decade, increasing attention has been paid to the issue of gender equity in the science, technology, engineering, and mathematics (STEM) fields. Research publications, including the American Association of University Women Educational Foundation's Tech Savvy (2000) and Women at Work (2003), have documented the troubling shortage of girls and women preparing to work in these fields. In response to this "**shrinking pipeline**" of girls and women in STEM, a wide array of programs and strategies has been promoted and funded by governmental and nongovernmental organizations.

(2) The AAUW Educational Foundation and the National Science Foundation are among the top supporters of gender equity projects in the STEM fields. In the last decade alone, these two foundations have

invested nearly \$90 million to fund more than 400 projects specifically aimed at increasing the participation of girls and women in STEM fields. This body of projects presented a unique opportunity to explore the nature of gender equity intervention projects in STEM. Until now, no comparable survey of gender equity intervention projects in STEM has been done.

(3) The research for this report, led by Yasmin Kafai and a team of researchers at the University of California, Los Angeles, was guided by several overarching questions: What types of projects have been funded within and across the various STEM disciplines? Are there areas where we have concentrated our efforts, and areas we have overlooked? What patterns emerge among the project types and disciplines?

(4) The findings document impressive efforts in preparing girls and women for science, technology, engineering, and mathematics studies and careers and demonstrate a rich and diverse body of gender equity intervention projects within all STEM disciplines. About two-thirds of the projects involved extracurricular informal learning activities such as museum visits and field trips. Equally important were mentoring activities in many forms, ranging from traditional one-to-one to large-scale online versions, and professional development activities, such as course taking and network building, that were successfully integrated into projects.

(5) At the same time, the findings reveal some troubling trends. Many projects focused predominantly on career advice without providing access to necessary skill and content development. A majority of projects occurred outside the school curriculum. While such extracurricular projects can be effective and valuable, the overall lack of integration into the school curriculum suggests that gender equity remains on the margins of teaching and learning in the STEM fields. Finally, an absence of data on participant demographics and a lack of project evaluation make it difficult to determine who is being served and if and how project outcomes are being measured.

31. What does the phrase "shrinking pipeline" in paragraph refer to?

- (A) the shortage of oil supply (B) the shortage of labor supply
(C) the shortage of training programs (D) an issue that is getting smaller

32. Which of the sentences below best express the essential information in the highlighted sentence in the passage 2? (Incorrect choices change the meaning in important ways or leave out essential information.)

- (A) These projects allowed us to study the differences between men and women employed in STEM jobs.
(B) We were able to intervene when women STEM workers were being treated unfairly.
(C) Studying these projects helped to create more gender equity intervention projects.
(D) STEM jobs were able to be studied by exploring nature.

33. In paragraph 3, "Are there areas where we have concentrated our efforts, and areas we have overlooked?"

In this sentence, "we" refers to

- (A) the author and his/her coworkers. (B) people involved in creating gender equity projects.
(C) people in the STEM disciplines. (D) Yasmin Kafai and his team.

34. According to paragraph 4, what is one positive finding of this research?

- (A) the STEM field is rich and diverse (B) many projects involved mentoring opportunities
(C) girls and women are being prepared for STEM jobs (D) the quality of the questions asked

35. According to paragraph 5, what is one negative trend discovered through this research?

- (A) access to unnecessary content (B) extracurricular projects were common
(C) evaluation of the projects was too specific (D) focus on career advice

Chili peppers are decidedly an international phenomenon, spicing up regional dishes from Thailand to North Africa. In Thailand Confidential, this week's Globalist Bookshelf selection, Jerry Hopkins gives insight

to the culture and history surrounding this fiery fruit (yes, technically a fruit) and highlights how it may be one of the world's best medical miracles.

In Thailand — where restaurants rate their dishes by placing one, two, three, and sometimes four little red chilis on the menu next to the dishes' names to alert diners — I am tolerated. Barely.

A longtime friend, who is a Thai chef, used to bring home food purchased at street stalls and as she placed this on the table, she would point to one container and say, "Mine," then to another, saying, "Yours." As if to say, "Poor dear."

Thailand is not the birthplace of the Capsicum, or chili pepper; it only acts as if it is. In fact, the chili was imported, along with much else in the national diet. However, in Thailand the **per capital consumption** of the small, fiery fruit is surely as high if not higher than it is anywhere else. And it is in the use of unprocessed, fresh, ripe chilis where Thailand rings all the loudest bells.

The truth is that chili is an international phenomenon. There is a bimonthly magazine published in the United States, Chili Pepper (there is no agreement on the spelling), and a wide variety of products is available, including pepper-shaped wind chimes, bells, and strings of Christmas tree lights. There is even a Hot Sauce Club of America; members receive two new hot sauces and a newsletter every month. There is even a popular American rock and roll band that calls itself the Red Hot Chili Peppers. Yes, the band is hot.

36. From these passages, we learn that the author

- (A) enjoys chili peppers everywhere.
- (B) does not really like chili peppers.
- (C) likes to have chili peppers to go with some certain kind of food.
- (D) like to go to restaurant famous for chili peppers.

37. The best title for these passages is

- (A) Thailand and Chili peppers. (B) Chili Peppers and Spicy Dishes.
- (C) Different Tastes all over the World. (D) Chili Peppers and Globalization.

38. Based on the passages, which of the following is NOT TRUE?

- (A) That Thailand uses unprocessed, fresh, ripe chili peppers has started the popularity of chili peppers.
- (B) Thailand exports a lot of chili peppers.
- (C) Chili peppers are a kind of fruit.
- (D) Thai food is normally quite spicy.

39. What does **per capital consumption** mean?

- (A) amount consumed per person within a specific population.
- (B) capital population and its consumption.
- (C) capital with that the government provides each person for food consumption.
- (D) capital that each person can get for their daily food consumption.

40. What is the main idea of the last paragraph?

- (A) Chili peppers are very popular in the United States.
- (B) The use of chili peppers in the United States is being influenced by Thailand.
- (C) Chili peppers are made into different toys.
- (D) Chilli peppers have made a rock band very hot.

IV. Essay. 20 points.

Please write a **well-structured** essay on **how you can prepare yourself for living in a diverse and more global society** in 150 to 200 words discussing your opinions.

應考同學得使用電子計算機。其他電子輔助機具一律不可使用。

1. The table below describes the occurrence of disease in a fictitious city of 100000 persons during a 3-year period. You may assume that new cases and deaths occurred, on average, at the mid-point of the time period.

	New cases	Cases at any time in the 3-year period	Deaths
Disease A	70	140	45
Disease B	30	30	5
Total	100	170	50

Please answer the following questions:

- 1-a. What was the **mortality rate** from disease A? (5%)
 1-b. What was the **prevalence** of disease B? (5%)
 1-c. What was the **average duration** of disease A? (10%)

2. An epidemiology of gastroenteritis due to staphylococcal enterotoxin occurred after breakfast on an airline. The following data was obtained from the 345 passengers on the airplane:

Food	Total number of passengers	Became ill (gastroenteritis)	
		eating	Not eating
Omelette	302	169	23
Ham	329	190	2
Cheese	197	103	89

Please answer the following questions:

- 2-a. For each food, calculate the attack rate of ill (gastroenteritis) among those who ate and among those who did not eat: (5%=每格 1%)

Food	Eating	did not eat
Omelette		$23/(345-302)=53.5\%$
Ham		
Cheese		

- 2-b. **Which food was contaminated? Why?** (10%)

3. The validity of the prostate-specific antigen (PSA) test for detecting prostate cancer was evaluated in a study. After a 4-year period of follow-up, 78 cases occurred in 14916 men from whom baseline serum had been collected. From the findings of this study, it could be estimated that 11.86% of those men screened had a positive result at baseline, however, 57 of them developed prostate cancer truly. Please answer the following questions:
- 3-a. Set-up a **2 by 2 table** (10%)
- 3-b. Calculating the **sensitivity** and **specificity** of the PSA test. (10%)
4. What is a case-control study? Please give **a definite example of case-control study with the statistic methods, and explain the advantage and drawback.** (25%)
5. Please describe what “**healthy worker effect**” is; in addition, please give a **definite example** to explain how the effect influences the study. (20%)

一、問答題(60%)

1. 碳元素微粒是都會及重工業都會區的細粒徑氣膠的主要化學組成之一，其組成可分為揮發及半揮發之有機碳(OC)與非揮發性之元素碳(EC)。藉由排放源排放 OC/EC 之比值可協助污染來源之判別及微粒污染改善策略之擬定。試述 OC 與 EC 來源上的差異(5%)，及兩者之測定方法(5%)。
2. 空氣中懸浮微粒會因光線散射作用，影響能見度。散射作用可分為 Rayleigh scattering、Mie scattering 及 non-selective scattering。試述三者的差異。(15%)
3. 我國目前河川水質建議值所涵蓋監測項目為何?(5%)，何謂河川污染指標 RPI?(5%)
4. 試述放流水標準管制與廢水總量管制之差異。(10%)
5. 試述我國毒性化學物質之分類?(10%)，並簡述其管理方式?(5%)

二、解釋名詞(40%，每題 5 分)

1. Leq
2. Basel Convention
3. Biomass energy
4. Environmental impact assessment
5. Ionization radiation
6. Hazardous waste
7. Carlson trophic state index
8. Biomarker

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- 一· 某研究調查城市與鄉村居民贊成建造核電廠的比例，結果發現 100 個城市居民的隨機樣本有 63 個贊成，而 125 個鄉村居民的隨機樣本有 59 個贊成，在 0.05 的顯著水準下，請問城市與鄉村居民贊成建造核電廠的比例是否有差異？又城市與鄉村居民贊成建造核電廠的比例差值之 95% 信賴區間為何？($Z_{0.95}=1.64$ ， $Z_{0.975}=1.96$ ， $\chi^2_{1,0.95} = 3.84$) (20%)
- 二· 某大學醫學系有 A、B、C 三班，每班之人數皆為 50 人，此三班學期之生物統計學平均成績分別為 70，84，76 分，變異數分別為 18.8，25.3，28.6。
請問 (1) 某大學醫學系生物統計學之平均成績為何？
(2) 某大學醫學系生物統計學之變異數為何？
(3) A、B、C 三班中何者之生物統計學成績差異最大？ (15%)
- 三· 信賴區間與假設檢定有何差異？在做假設檢定時，「不顯著」(Not Significant) 的意思是什麼？P 值的意義又為何？ (15%)
- 四· 某位心臟內科之教授想要知道受過高度訓練的男性與女性跑者在做過腳踏車運動之後的平均最大心跳速率之間是否有差異存在。假設該心臟內科醫師從男性與女性跑者各隨機抽取 n 人(即男性跑者樣本數為 n，女性跑者樣本數亦為 n) 為研究樣本，男性跑者之最大心跳速率之平均數為 \bar{X}_1 ，標準差為 S_1 ，女性跑者之最大心跳速率之平均數為 \bar{X}_2 ，標準差為 S_2 。
(A) 使用變異數分析法，請完成變異數分析表。
(B) 使用 t 檢定，檢定二組母主體平均數之間是否有差異，請寫出 t 檢定之公式 (20%)
- 五· 請解釋皮爾森相關係數(Pearson's product moment correlation coefficient) 和簡單直線迴歸係數(regression coefficient) 有何不同？二者又有何關數？又何謂決定係數(coefficient of determination)，其與相關係數有何關係？ (15%)
- 六· 某位研究者想要瞭解維他命 C 是否會減少感冒的頻率。為了減少不同家庭環境造成之影響，研究者以 20 對雙胞胎為樣本，隨機指派其中之一服用維他命，另一個則不服用，

一個學年後，記錄每位小孩在此學年因感冒而請假的天數，其後用配對樣本的 t 檢定來檢定虛無假說。

- (a)從統計學的角度而言，請問本研究中，配對可以對實驗設計有何貢獻?
- (b)和兩個獨立樣本的情況比較時，配對會造成自由度的減少還是增加?
- (c)什麼因素會造成一個變數必須加以配對 (15%)