

NOTE: on your answer sheet, find the number of the question and mark your answer.

I. SENTENCE COMPLETION: You are to choose the word or phrase that best completes the sentence. 20%

1. Joe is really creative fashion designer. He can always be relied on to ____ new ideas.
(A) put up with (B) come up with (C) face up with (D) draw to
2. Everyone admired Dr. Victor Chang, the brilliant heart transplant surgeon. He was respected _____the world.
(A) outside (B) over (C) throughout (D) through
3. At the end of the century, the Y2Kcomputer virus could have caused ____ in information systems worldwide.
(A) problem (B) chaos (C) stoppage (D) fright
4. Have you ever ____ about a career in the electronics industry? I think you would be very successful.
(A) thought (B) spoken (C) discussed (D) considered
5. I love springtime, when the mountains are covered in wild flowers. It's the most ____ time of the year.
(A) awful (B) delightful (C) painful (D) fruitful
6. We've having a college reunion next week. ____ you like to join us?
(A) Will (B) Can (C) Could (D) Would
7. Sometimes I get sick of studying, but I know it will be ____ it in the end.
(A) good (B) useful (C) worth (D) worthwhile
8. It's very ____ when someone uses a cell phone during a movie because it disturbs other people.
(A) annoyed (B) interesting (C) annoying (D) frustrated
9. ____ my grandfather is 85 years old, he still walks miles everyday.
(A) Even (B) Despite (C) Although (D) However
10. That's the last time I'll go to that restaurant. The food made me ____ and I had to see a doctor.
(A) angry (B) sad (C) unhappy (D) sick

II. CLOZE TEST: This passage contains several missing words or phrases. You are to choose the best answer for each missing word or phrase in the passage. 10%

The small Greek island of Eleni is not popular with tourists because it is isolated and difficult to get to. There are only two ferry services a week from Athens and the trip (11) eleven hours. Nevertheless, it was the ideal (12) for me to take the quiet vacation that I had dreamed about for so long. On the first evening, I sat on a sandy beach admiring the beauty of the sea and (13) the

trapezoid and is played by striking the strings with small wooden hammers called mallets. On the hammered dulcimer, there are sets of two, three, or four strings, called courses, which are struck at one time to sound each note. There are from twelve to twenty-two courses on a standard hammered dulcimer. The hammered dulcimer is usually categorized as belonging to the zither family of string instruments, although some musicologists challenge this classification.

The Appalachian dulcimer's immediate ancestors include the German scheitholt, the French epinette, and perhaps the Swedish hummel. It is classified as a member of the lute family of instruments. Appalachian dulcimers are painstakingly crafted by artisans, mainly in the mountain areas of West Virginia, Kentucky, Tennessee, and Virginia. They have three strings—the melody, middle, and bass string. Sometimes a second melody string is added. This instrument is played by plucking the strings with the fingers or with quills. They are shaped like teardrops or hourglasses. Heart-shaped holes in the sounding boards are traditional. Most performers play the instrument while seated with the instruments in their laps, but others wear them around their necks like guitars or place them on tables in front of them. Before the 1960's, the Appalachian dulcimer had a limited appeal. It was usually associated with dance music and with "hillbilly" music. However, the instrument was popularized by musicians such as Jean Richie and Richard Farina during the folk music revival of the 1960's and is today featured in many types of music.

21. The author says that the word dulcimer
 - (A) means "wooden box" (B) was not used until the 1960's
 - (C) means "sweet song" in Persian (D) comes from two languages
22. What is the greatest number of notes that could be played on a standard hammered dulcimer?
 - (A) Three (B) Four (C) Twelve (D) Twenty-two
23. According to the passage, experts do NOT all agree that the
 - (A) Appalachian dulcimer is a member of the lute family
 - (B) hammered dulcimer should be classified as a string instrument
 - (C) hammered dulcimer is a member of the zither family
 - (D) Appalachian dulcimer had a limited appeal before 1960
24. Which of these instruments could NOT be considered an ancestor of the Appalachian dulcimer?
 - (A) The zither (B) The epinette (C) The santir (D) The scheitholt
25. According to the passage, how many strings does the Appalachian dulcimer have?
 - (A) One or two (B) Three or four (C) Four or five (D) Six or more
26. According to the passage, most musicians play the Appalachian dulcimer
 - (A) while sitting down (B) with the instrument around their necks
 - (C) while standing next to tables (D) with wooden hammers
27. According to the passage, Jean Richie and Richard Farina are known for
 - (A) playing dance music and "hillbilly" music
 - (B) designing and building Appalachian dulcimers
 - (C) helping to bring more attention to dulcimers
 - (D) beginning the folk music revival of the 1960's

Pigeons have been taught to recognize human facial expressions, upsetting long-held beliefs that only humans have evolved the sophisticated nervous systems needed to perform such a feat. In recent experiments at the University of Iowa, eight trained pigeons were shown photographs of people displaying emotions of happiness, anger, surprise, and disgust. The birds learned to distinguish between these expressions. Not only that, but they were able to correctly identify the same expressions on photographs of unfamiliar faces. Their achievement does not suggest, of course, that the pigeons had any idea what the human expressions meant.

Some psychologists had theorized that, because facial expression is vital to human communication, humans have developed special nervous systems capable of recognizing subtle differences between expressions. Now the pigeons have cast doubt on that idea.

In fact, the ability to recognize facial expressions of emotion is not necessarily innate even in human babies, but may have to be learned in much the same way that pigeons learn. In experiments conducted several years ago at the University of Iowa, it was found that pigeons organize images of things into many of the same logical categories that humans do.

None of these results would come as any surprise to Charles Darwin, who long ago wrote about the continuity of mental development from animals to humans.

28. From the information in paragraph 1, it can be inferred that pigeons
- (A) show more emotions than people thought they could
 - (B) can understand the human emotions of happiness, anger, surprise, and disgust
 - (C) can identify only the expressions of people that they are familiar with
 - (D) have more sophisticated nervous systems than was once thought
29. The author probably believes that the psychologists mentioned in paragraph 2
- (A) will need to revise their theory
 - (B) no longer believe that expressions are important in human communication
 - (C) have conducted their own experiments with pigeons
 - (D) no longer think that the pigeons have cast doubt on their theories
30. In paragraph 3, the author suggests that, at birth, human babies
- (A) have nervous systems capable of recognizing subtle expressions
 - (B) can learn from pigeons
 - (C) are not able to recognize familiar faces
 - (D) may not be able to identify basic emotions through facial expressions
31. What can be inferred about the experiments that were conducted several years ago at the University of Iowa?
- (A) They were completely contradicted by more recent experiments.
 - (B) They supported the idea that pigeons and humans share certain mental abilities.
 - (C) They were conducted by scientists on human babies.
 - (D) They proved that animals other than pigeons could recognize human expressions.

32. If Charles Darwin could have seen the results of this experiment, his most probable reaction would have been one of _____ .

(A) rejection (B) surprise (C)agreement (D)amusement

The 1960's saw a rising dissatisfaction with the modernist movement in architecture, especially in North America, where its failings were exposed in two influential books, Jane Jacobs's *The Death and Life of Great American Cities* in 1961 and Robert Venturi's *Complexity and Contradiction in Architecture* in 1966. Jacobs highlighted the destruction of the richness and variety of America that occurred as a result of the urban renewal programs sponsored by the federal government. She went on to say that these historic buildings were being replaced by massive, impersonal buildings. Venturi implied that modernist structures were without meaning because they lacked the complexity and intimacy of historical buildings. Both writers called for a new style of architecture.

By the early 1980's, post-modernism had become the dominant style, particularly for public buildings in the United States. Post-modernism evolved from modernism and yet it is a contradiction of that style. In fact, post-modernists have little in common with one another in terms of style or theory. They are united mainly in their opposition to the modernist style. One quality that is common to many post-modernist buildings is characterized by what architect Peter Jencks calls "double coding," a mixture of two styles: modern mixed with tradition, contemporary with historical, functional with decorative, and familiar with newly invented. These characteristics can be seen in Robert Venturi's bold designs for the Brant-Johnson House (1975) in Vail, Colorado, which mixes contemporary and Italian Renaissance style. Similar characteristics are clear in the work of Venturi's disciple Michael Graves's Portland Building (1982) in Portland, Oregon, and his Humana Tower (1986) in Louisville, Kentucky, have the bulk of skyscrapers but incorporate historical souvenirs such as colonnades, belvederes, keystones, and decorative sculpture. Likewise, Robert Stern's Observatory Hill Dining Hall (1984) at the University of Virginia in Charlottesville, Virginia, combines the red brick and white wood of Thomas Jefferson's original plan for university building with modern building forms and walls with large windows. Chinese-American architect I. M. Pei's design for an addition to the Louvre Museum in Paris (1989) included a glass pyramid, referring to the Egyptian art in the Louvre and the fact that French emperor Napoleon Bonaparte played a major role in making Egypt a subject of study in the early 1800's.

Another major tendency in post-modern architecture is the emphasis on decoration, which modernism eliminated. This can be seen in the works of Phillip Johnson, who was once a champion of modernism but became an out-spoken advocate of post-modernism. He wrapped the AT&T building (1984), which is now the SONY Building, in New York City, in pinkish granite and topped it with a tower that looks like an enormous piece of Chippendale furniture. Some architects turned entire building into sculptures. Frank Gehry's monumental Guggenheim Museum in Bilbao, Spain (1997), resembles an enormous abstract sculpture made of glass and titanium steel.

Glossary

Chippendale: an ornate style of furniture first developed in Britain in the eighteenth century

33. Which of these statements best expresses the opinion of Jane Jacobs and Robert Venturi as given in paragraph 1 ?
- (A) Post-modern buildings are massive and impersonal.
 - (B) Modernist architecture is rich and varied
 - (C) The federal government should increase its urban renewal efforts.
 - (D) Modernism should be replaced by some other style of architecture.
34. The primary purpose of the second paragraph is to
- (A) explain “double coding” and give examples of various combinations of styles
 - (B) describe several features of skyscrapers
 - (C) discuss how Pei’s pyramid refers to Napoleon Bonaparte and his study of Egyptian culture
 - (D) show how post-modernism evolved from modernism
35. The author probably uses the word *souvenirs* in paragraph 2 because
- (A) tourists often visit the Portland Building and the Humana Building and buy souvenirs
 - (B) the Portland Building and the Humana Building now exist only in people’s memories
 - (C) some features of the Portland Building and the Humana Building remind people of the past
 - (D) the Portland Building and the Humana Building house important museums
36. The author presents details about the AT&T (now the SONY) building in New York City to show that it
- (A) resembles an abstract sculpture
 - (B) influenced post-modern furniture design
 - (C) was built when Johnson was modernist architect
 - (D) has ornamental architectural features

In April 1874, an art exhibit opened in Paris featuring famous and priceless works of art. However, at the time, no one knew that these paintings would one day be considered masterpieces. The paintings and the painters were **virtually** unknown at the time and would remain that way for several years. (Paragraph 1)

In the nineteenth century, French art was dominated by the Academy of Fine Arts. Every year the academy held an art show called *Le Salon*. In 1863, the Academy rejected one of the paintings of Edouard Manet. Manet and a group of other independent artists organized their own show, which they called *Salon des Refuses* (Salon of the Rejected), which opened on April 15, 1874. A newspaper critic named Louis Leroy visited the gallery and was not pleased with what he saw. One painting of boats in a harbor at dawn by Claude Monet particularly enraged him. It was called *Impression: Sunset*. Leroy wrote that this piece and in fact most of the pieces in the show, looked like “impressions”—a term for a preliminary, unfinished sketch made before a painting is done. Leroy’s newspaper review was jokingly called “The Exhibition of the Impressionists.” Within a few years of Leroy’s review, the term *Impressionists* had clearly stuck, not as a term of **derision** but as a badge of honor, and a new movement was born. (Para 2)

The Impressionist movement included the French painters Edouard Manet, Claude Monet, Pierre-Auguste Renoir, Edgar Degas, Paul Cezanne, and the American painter Mary Cassatt. The

techniques and standards employed within the Impressionist movement varied widely, and though the artists shared a core of values, the real glue which bound the movement together was its spirit of rebellion and independence. (Para 3)

This spirit is clear when you compare Impressionist paintings with traditional French paintings of the time. Traditional painters tended to paint rather serious scenes from history and mythology. Many Impressionist paintings feature pleasant scenes of urban life, celebrating the leisure time that the Industrial Revolution had won for the middle class, as shown in Renoir's luminous painting *Luncheon of the Boating Party*. In that famous painting, the sun filters through the orange-striped awning, bathing everything and everyone at the party in its warm light. Renoir once said that paintings should be "...likable, joyous, and pretty." He said, "There are enough unpleasant things in this world. We don't have to paint them as well." It is this joy of life that makes Renoir's paintings so distinctive. (Para 4)

The Impressionists delighted in painting landscapes (except for Edgar Degas, who preferred painting indoor scenes, and Mary Cassatt, who mainly painted portraits of mothers and children). Traditional painters, too, painted landscapes, but their landscapes tended to be somber and dark. The Impressionists' landscapes sparkle with light. Impressionists insisted that their works be "true to nature." When they painted landscapes, they carried their paints and canvases outdoors in order to capture the ever-changing light. Traditional painter generally made preliminary sketches outside but worked on the paintings themselves in their studios. (Para 5)

"Classic" Impressionist paintings are often easy to spot because of the techniques used by the painters. One of the first "rules" of the Impressionist, that the colors should be dropped pure on the canvas instead of getting mixed on the palette, was respected by only a few of them and for only a couple of years, but most Impressionists mixed their paints as little as possible. They believed that it was better to allow the eye to mix the colors as it viewed them on the canvas. The traditional technique at the time was to make sketches or outlines of the subject before painting them. Generally, Impressionists painted directly onto the canvas without sketches. Impressionists tended to paint with short, thick strokes of paints shaped like commas. While traditional painters paid attention to details, Impressionists valued overall effect. Traditional painters always tried to hide their brush strokes, but Impressionists left brush strokes on the canvas for the world to see. Unlike traditional painters, Impressionists applied one layer of paint on top of the last one without waiting for the paint to dry. These techniques created paintings that seemed strange and unfinished to the general public when they were first painted, but are much loved in our time. (Para 6)

37. What point does the author make about the art show that opened on April 15, 1874, at the Salon des Refuses in Paris ?

- (A) It was more popular with visitors and critics than the official show called "Le Salon."
- (B) It made the painters and paintings shown there instantly successful.
- (C) Its organizers refused to allow Edouard Manet to display his paintings there.
- (D) It featured famous paintings and painters before they became well known.

38. The word virtually in the passage is closest in meaning to the word _____.

- (A) almost (B) infinitely (C) seemingly (D) forever
39. According to the author, Louis Leroy used the term “Impressionists” because _____ .
- (A) he understood that these artists did not carefully study their subjects, but only got a quick impression of what they painted
- (B) he thought that Monet’s painting, and all of the paintings at the show, looked like unfinished drawings
- (C) he believed that giving these artists a group name would help them become famous
- (D) he thought that the painting *Impression: Sunset* was the best painting at the show
40. The word **derision** in the passage is closest in meaning to
- (A) ridicule (B) sincerity (C) respect (D) sorrow
41. Renoir’s painting *Luncheon of the Boating Party* is given in paragraph 4 as an example of
- (A) an industrial scene (B) a study of some urban buildings
- (C) a picture of people enjoying their leisure time (D) a traditional French painting
42. According to the information in paragraph 5, what did the painters Edgar Degas and Mary Cassatt have in common?
- (A) They both painted portraits of children and mothers.
- (B) Neither of them was originally from France.
- (C) Neither of them was primarily interested in landscapes.
- (D) They both preferred painting unpleasant scenes.
43. According to paragraph 5, when traditional painters worked on landscape paintings, they
- (A) studied the ever-changing light (B) did not make any preliminary sketches
- (C) never left their studios (D) sketched outdoors but painted indoors
44. It can be inferred from the information in paragraph 6 that in the author’s view, the first “rule” of Impressionism _____ .
- (A) was not really a rule at all (B) was the most important rule of all
- (C) led Impressionists to mix their colors (D) lasted longer than other rules
45. The phrase **the last one** in the passage refers to
- (A) an artist (B) a painting (C) a brush stroke (D) a layer of paint

Genetic Engineering is a radical and rapidly developing technology that touches our lives through its application in medicine, forensics, industry and agriculture. Through this science humans are fast becoming the architects of life but there are those who warn against the unknown dangers of playing God while others see its benefits in our fight against disease and the production of **abundant** food supplies.

In the past 50 years, plant and animal production has increased dramatically. Today, the human population is the largest it has ever been and fortunately we produce more food per capita than ever before. Despite the fact that we have enough food for every single human being to have an adequate diet, some 1 billion people still suffer from malnutrition and hunger. A lot of the increase in food

production is **attributed to** efficient farming methods and environmental factors such as irrigation, pest and weed control but the largest contributing factor is modern plant and animal breeding.

Genetically engineered plants and animals have already entered the market and are on our supermarket shelves. Their appearance however has sparked much debate. Scientists have improved plants by changing their genetic makeup through *hybridization* since the 19th century, and farmers have used *crossbreeding* of plants and animals for thousands of years. For example, racehorses are bred to be faster and stronger and roses are bred to produce a wide range of colors. Cattle are bred according to whether they are for beef or dairy herds. Most of today's dairy cattle are very different from the cattle that were originally domesticated. Over the years, dairy herd breeding has focused on increasing milk production and quality. Milk production per cow has doubled in the last 25 years.

So what are GM food and what are the concerns for the consumer? The main difference between GM foods and traditional breeding methods is the direct modification or manipulation of certain genes. Traditional methods involve mixing thousands of genes whereas genetic modification allows just one individual gene, or a small number of genes, to be inserted into a plant, or animal.

The resulting organisms are “genetically modified,” “genetically engineered,” or “transgenic”. The foods that reach the supermarket are known as “GM” foods, *Genetically Modified foods*. The technique allows us to produce plants, animals and microorganisms, such as bacteria, with specific qualities more accurately and efficiently than through traditional methods.

The benefits of GM foods are enormous. Genetic modification can be used to give crops immunity to plant viruses or to improve the nutritional value of a plant. In animals intended for food, genetic modification could potentially increase how fast and how big they grow. *Starvation* on any part of the planet could be a thing of the past as we could the yield, varieties and size of foods and produce strains that are resistant to pests, Extremes in temperature and are tolerant to herbicides.

Opponents of GM foods however consider their production to be the world's biggest uncontrolled biological experiment, a disaster waiting to happen. The biggest concerns are the effects that an uncontrolled genetically modified species could potentially have on human and animal health, agriculture, and on the environment as a whole. Genetically modified species have the potential to become biological pollutants that are far worse than chemical pollutants as they would be virtually impossible to control since they are alive, migrate and could **mutate** producing even more dangerous offspring. This could lead to irreversible damage to the ecology of the planet.

Recent studies have shown that transgenic species could potentially hold bigger surprises than scientists anticipate. Genetically altering plants to resist viruses can cause the virus to mutate into new forms that could potentially be spread. The effect on crops could be disastrous. The toxins released by the genetically mutated virus could also have untold damaging effects on human, animal and plant life. Toxins can produce severe allergic reactions leading to death. (Para 8)

Another example could be the release of larger species into the environment. For example, what if scientists release squid, octopus and salmon that are 3 times their natural size. The new species would eat far more food, leaving less for other species possibly leading to the extinction of several

species that would ultimately damage the delicate ecology of our seas and therefore the planet as whole.

At the moment there is no proof of serious harm to humans, animals and plants but potential for a massive biological disaster that could wreak and irreversible damage is not such a fairy tale. On the other hand the possibility of forever freeing the world of starvation could outweigh ant possible dangers that may or may not be unleashed.

46. What is main difference between GM and traditionally bred foods?
- (A) Scientists can choose the outcome of GM foods such as size and color.
 - (B) The consumer is far more concerned about GM foods.
 - (C) Traditional methods rely on the direct manipulation of only certain genes.
 - (D) The difference lies in the methods and the number of genes that are affected.
47. Why has the appearance of GM foods in the supermarket sparked much debate?
- (A) Some people are worried about man taking over God's role of creator.
 - (B) Some people think GM foods should be sent to feed third world countries.
 - (C) Some people are concerned about the effects on our health and environment.
 - (D) Scientists do not know enough about the harmful effects of certain bacteria
48. In paragraph 6, why does the author state that starvation could be a thing of the past?
- (A) Because all varieties of genetically modified plant or animal will be able to survive in any environment.
 - (B) Scientists will be able to raise genetically modified animals on genetically modified animal feed which will dramatically increase their size.
 - (C) There would be no need to use expensive herbicides since all genetically modified crops will be pest resistant.
 - (D) Scientists will be able to control the size, variety and immunity of crops and animals.
49. In paragraph 7, what is the main opposition to the production of GM foods?
- (A) Chemical pollutants are more dangerous than biological pollutants.
 - (B) GM foods are not properly tested.
 - (C) Opponents to GM foods say that their production is an agricultural disaster waiting to happen.
 - (D) The potential of producing harmful offspring could not be controlled.
50. In paragraph 8, why does the author say that scientists might be surprised?
- (A) Toxins are carried through the air by wind dispersal.
 - (B) There is a potential that any new virus strains could be carried to other areas adversely affecting crops, human and animal life.
 - (C) They are often surprised by transgenic species.
 - (D) Toxins can potentially kill all life forms.

高雄醫學大學 100 學年度研究所招生考試試卷

系所：公共衛生學系公共衛生學碩士班
科目：生物統計學 (可使用電子計算機)

做題中所需之統計分佈數值如下：

$$Z_p : Z_{0.95} = 1.645, Z_{0.975} = 1.96; \chi_{df,p}^2 : \chi_{1,0.95}^2 = 3.84, \chi_{1,0.975}^2 = 5.02$$

第一部分：單選題 15 題，每題 4 分

1. 下列哪種方法不能被用來檢定前後測差異：
 - A. Paired t-test
 - B. McNemar test
 - C. Wilcoxon signed rank test
 - D. 2 sample t-test

2. 以下何者有關常態分佈的敘述不正確：
 - A. 平均值(mean)及眾數(mode)都在同一點
 - B. 大於平均值的機率佔了 50%
 - C. 標準常態分佈的平均值為 1
 - D. 標準常態分佈 Z 軸上-1 到 1 所對應之機率約為 68%

3. 如果 Z 呈標準常態分配，請問 $(-1.645 < Z < 1.96)$ 之機率為何：
 - A. 0.950
 - B. 0.900
 - C. 0.975
 - D. 0.925

4. 有關中央極限定理 (Central Limit Theorem)，是指某一測量值(X)並非呈常態分配，但其平均值為 μ 、標準差為 σ ，則依據中央極限定理，以下何者在樣本數夠多的時候會趨近於常態分配？
 - A. X_i
 - B. \bar{X}
 - C. $s^2 = \sum (X_i - \bar{X})^2 / (n-1)$
 - D. $(X_i - \mu) / \sigma$

5. 某一樣本中有 25 名學童，其體重之樣本平均值與樣本標準差分別為 30 公斤與 5 公斤，請問學童體重的 95%信賴區間為何？
- A. $30 \pm t_{24, 0.975} \cdot \frac{5}{\sqrt{25}}$
- B. $30 \pm Z_{0.975} \cdot \frac{5}{\sqrt{25}}$
- C. $30 \pm t_{24, 0.95} \cdot 5$
- D. $30 \pm t_{25, 0.975} \cdot \frac{5}{\sqrt{25}}$
6. 以基因晶片篩檢癌症為例，若虛無假設為沒有癌症，對立假設為罹患癌症；同時晶片篩檢的結果也有兩種判斷，分別是判斷為罹病及判斷為正常(沒有罹病)。則型一錯誤 (Type I error)是指？
- A. 有癌症卻判斷為正常
- B. 有癌症且判斷為罹病
- C. 沒有癌症且判斷為正常
- D. 沒有癌症卻判斷為罹病
7. 以 ANOVA 方法檢定 5 種減重藥的體重減輕的效果，結果為顯著，後續要進行兩兩多重比較，請問若整體型一錯誤(type I error rate)欲維持在 0.05，若以 Bonferroni 法調整多重檢定之顯著性水準應為多少？
- A. 0.05
- B. 0.01
- C. 0.005
- D. 0.0025
8. 若欲比較男生與女生的體重(kg)有無差異(假設不確定男女生母群體的體重是否成常態分配)，今收集 8 位男生與 8 位女生之體重，請問下列何種分析方法最恰當？
- A. independent-sample t-test
- B. paired-t test
- C. Wilcoxon rank sum test
- D. Wilcoxon signed rank test

9. 變異數分析(ANOVA)檢定多組平均數是否相同，其檢定原理主要是利用哪兩種變異的比值進行檢定？
- A. 組間變異/組內變異
 - B. 組間變異/總變異
 - C. 組內變異/總變異
 - D. 迴歸變異/總變異
10. 在一個 2×2 的表格中做卡方檢定(Chi-square test)後，發現表格中有些預期值(expected value)小於 5，下列何種檢定法可被用來取代卡方檢定成為較可行之檢定法：
- A. Chi-square test with Yate's correction
 - B. Fisher's exact test
 - C. 2 sample t-test
 - D. McNemar test
11. 若檢定之顯著性水準為 0.05，請問下列敘述何者不正確？
- A. 雙尾檢定的 p-value 比單尾檢定的 p-value 大
 - B. 檢定之型一及型二錯誤無法同時變小
 - C. 若 $p\text{-value} > 0.05$ ，表示虛無假設 H_0 為真
 - D. 若樣本數增加的話，則檢定之型二錯誤會降低
12. 若針對某一社區居民隨機抽樣 100 人，此樣本之平均年齡為 45 歲，已知其平均年齡顯著不同於 54 歲，則下列何者 95%信賴區間較正確：
- A. (50, 55)
 - B. (35, 55)
 - C. (40, 53)
 - D. (37, 53)
13. 若調查 400 位學校的教職員，在學校評鑑前、後睡眠困擾的情形，若想了解學校教職員的睡眠困擾是否與學校評鑑有關，應採用何種檢定方法？
- A. McNemar's test
 - B. Chi-square test
 - C. Mantel-Haenszel test
 - D. Fisher's exact test

14. 關於變異數分析(ANOVA)的基本假設，以下何者不正確？
- 相比較的各組均呈常態分配
 - 相比較的各組間母群體平均值皆相同
 - 相比較的各組間母群體的變異數皆相同
 - 各組皆來自於隨機樣本
15. 母體平均數之信賴區間(confidence interval)的長度不會受到下列哪一因素影響？
- 樣本平均數
 - 樣本數
 - 信賴係數
 - 樣本標準差

第二部分：計算題 4 題，每題 10 分 (答案請準確至小數點以下二位)

1. 某項早餐食品的熱量(calories per serving)調查顯示，70 項受檢產品的基本統計量如下表所示，

Mean	146.43
Standard Deviation	46.97
Median	120.00
25 percentile	110.00
75 percentile	200.00
Minimum	50.00
Maximum	250.00

- (5 分)請計算標準誤(standard error)?
- (5 分)請問此 70 項產品的熱量數據是否會呈對稱分佈?為什麼?

2. 在一項比較學童的 finger-wrist tapping score 中，分了 ABC 3 組，以下是比較這 3 組 score 的分析，若將 C 組學童設為對照組，並針對 AB 兩組設 dummy variables，執行複回歸(multiple regression)分析後，得到估計的迴歸係數(parameter estimate)如下表：

	parameter estimate
Group C	reference
Group A	-5.29
Group B	-4.99
Age in years	2.44

- 請解釋上表中"-5.29"所代表之意義?(5 分)
- 請解釋上表中"2.44"所代表之意義?(5 分)

3. 某一實驗中有 100 個病人使用 A 藥、200 個病人使用 B 藥，使用 A 藥者有 11 個人痊癒、使用 B 藥者有 34 人痊癒，請比較 A、B 兩種藥痊癒之比率是否相同？

- (a) 應使用何種檢定方法？
- (b) 請寫出虛無假設與對立假設，
- (c) 請計算檢定值，
- (d) 檢定結果是否具顯著性差異，
- (e) 此檢定結果所代表之意義為何？

4. 有 20 位學生參加微積分考試，若學生來自三個學系，欲比較三個學生成績是否有差異，下表為分析之部分結果：

ANOVA

	Sum of Squares	df	Mean Squares	F	p-value
Between Groups	3308.811		(C)	(D)	.003
Within Groups	(A)		201.082		
Total	(B)				

- (a) 請計算出(A)、(B)、(C)、(D)之數值為何？
- (b) p-value=0.003 所代表之意義為何？

一、 選擇題 (60 分)

1. 都市中光化學煙霧的前驅污染物主要來自(1)汽機車排放(2)工廠排放(3)樹木的芬多精(4)海洋中釋出的鹽類
2. 規範臭氧層破壞為那一個國際條約？(1)斯德歌爾摩公約(2)華盛頓公約(3)京都議定書(4)蒙特婁議定書。
3. SPF 15 可阻隔多少 UV-B (1)85% (2)91.1% (3) 93.3% (4) 96.6% 。
4. 台灣能源的能量供應以哪種最多(1)煤(2)石油(3)天然氣(4)核能
5. 下列那種物質辛烷值被定為 100 (1)苯(2)四乙基鉛(3)異辛烷(4)正庚烷
6. 評估水庫水質優養程度的指標「卡爾森指數」，下列何者不是用以評估「卡爾森指數」的水質參數(1)透明度(2)葉綠素a(3)總磷(4)溶氧量
7. 下列哪一種燃料燃燒不會產生碳氫化合物(1)氫氣(2)煤(3)汽油(4)柴油
8. 下列何者不是非游離輻射(1)射頻輻射(2)微波(3)紅外線(4) γ -射線區
9. 台灣極低頻輻射的標準(1) 83.3 (2) 100 (3) 833.3 (4) 1000 mG
10. 下列何者不是影響紫外線強度的因素(1)海拔高度(2)緯度(3)二氧化碳的濃度(4)臭氧層的厚度
11. 下列何者目前於台灣無室內空氣污染建議值之污染物(1)二氧化氮(2)一氧化碳(3)臭氧(4)細菌
12. 如果你進入一剛裝潢好的房子 10 分鐘後，發現有眼睛刺激，鼻子不舒服，造成這種現象的物質可能為(1)苯(2)臭氧(3)甲苯(4)甲醛
13. 有關廢棄物跨國境移動的處置與規定的公約為(1)巴塞爾公約(2)斯德歌爾摩公約(3)拉姆薩公約(4)華盛頓公約
14. 政府為了配合資源永續及零廢棄趨勢，我國垃圾清理政策以什麼為主？(1)源頭減量，資源回收(2)垃圾掩埋(3)垃圾堆肥(4)以上皆是
15. 1984 印度波帕爾事件由於哪種物質外洩，產生爆炸(1)二氧化硫(2)臭氧(3)多氯聯苯(4)異氰酸甲酯
16. 下列何者非指標污染物(1)二氧化碳(2)一氧化碳(3)臭氧(4)鉛
17. 以台灣而言，空氣污染指標(PSI)超過 100 的污染物，主要為哪兩種(1)二氧化氮、臭氧(2)臭氧、懸浮微粒(3)懸浮微粒、一氧化碳(4)一氧化碳、碳氫化合物
18. 毒奶粉事件中，元兇為那種化合物(1)三聚氰胺(2)三氯甲烷(3)三氯乙烯(4)三氧化二砷

19. IARC對於致癌物分類，其中石棉是屬於哪一分類：(1) Group 1 (2) Group 2A (3) Group 2B (4) Group 3
20. 假設某人同一場所工作，工作40年，每年工作250天，每天工作8小時，工作場所的空氣中含 0.2 ug/m^3 的甲醛，而空氣中甲醛的背景濃度為 0.01 ug/m^3 。假設該人的呼吸量為 $0.83 \text{ m}^3/\text{hr}$ ，壽命為75歲，此人經由空氣的甲醛暴露量為(1) 2.31 (2) 13.28 (3) 15.59 (4) 20.32 mg
21. Kow (正辛醇-水分配係數) 與生物濃縮因子相關，評估下列化學物質，何者之Kow最大 (1) 苯 (2) 多氯聯苯 (3) 甲醛 (4) 三氯甲烷
22. 下列有關游離輻射之敘述何者錯誤 (1) 能使物質產生游離現象之輻射能稱為游離輻射 (2) 在工業上常使用者為 α 、 β 、 γ 、X射線及中子射線等，多用於破壞性檢測 (3) 游離輻射對人體主要危害器官為造血器官 (4) 長期低劑量游離輻射暴露可能造成細胞染色體突變或致癌。
23. 何者錯誤 (1) 孔雀石綠是一種有毒的三苯甲烷類人工合成有機化合物 (2) 孔雀石綠既是食物配料，也是膨脹劑，可致癌 (3) 孔雀石綠是帶有金屬光澤的綠色結晶體 (4) 可用作治理魚類或魚卵的寄生蟲、真菌或細菌感染
24. 何者為非點污染源(non-point source) (1) 農田的沖蝕造成的污染 (2) 工廠廢水處理場的排放 (3) 衛生下水道的排放 (4) 工業區聯合污水處理廠的排放
25. 有機氯農藥主要儲存於生物體的那個組織 (1) 骨頭 (2) 脂肪 (3) 神經 (4) 血液
26. 砂眼屬於 (1) water borne (2) water-washed (3) water-based (4) water-related 疾病
27. 2007年台中市爆發的痢疾疫情屬於 (1) water borne (2) water-washed (3) water-based (4) water-related 疾病
28. 下列何者不是環境暴露評估的特徵 (1) 暴露人數多 (2) 暴露於單一或少數幾種污染源 (3) 暴露無特異性 (4) 缺乏好的評估指標
29. 下列何者非環保署用以評估河川污染程度指標之水質參數 (1) 懸浮固體 (2) 氨氮 (3) 水溫 (4) 生化需氧量
30. 環境暴露評估中估算可容許攝取劑量時，皆考慮攝取者的重量與攝取期間，常用的可容許攝取劑量表示方式為 (1) ppm/hour (2) mg/kg-day (3) kg/100 lb-week (4) mg/kg-m³.

二、問答題 (40分)

1. 請說明空氣污染指標的定義，與其用途。(10分)
2. 請說明感染性事業廢棄物的貯存與清理方式？(10分)
3. Assume a person works in a municipal incineration plant for 30 years. The PAH concentration in the plant is 4500 ng/m^3 . He lives 10 km away from the incinerator. He rides the motorcycle to the plant every day at a speed of 30 km/hr. The PAH emission for motorcycle is 100 ng/m^3 . The PAH concentration in his home is about 1/100 of the plant. Please calculate this person lifetime cancer risk? (Assumed this person lives in the same place for his whole life (70 years), body weight is 70 kg, potency factor of PAH is $2.9 \times 10^{-2} (\text{mg/kg-day})^{-1}$) (20分)

1. Table 1 shows the numbers of cases of influenza in two towns in 2008 and 2010. Health programs for preventing influenza were introduced in both towns in 2009. Calculate the absolute and relative changes in each town. In which town is there stronger evidence that the program was effective in reducing the occurrence of influenza? (10%)

Table 1: Number of cases of influenza

	Town A	Town B
2008	500	5000
2010	200	4000

2. What measure of disease frequency (incidence rate, cumulative incidence, prevalence) is each of the following? (10%)
- (a). The percentage of freshman girls who become pregnant over the course of their high school years.
 - (b). The percentage of senior boys who are fathers at the time of graduation.
 - (c). The number of liveborn babies who die of sudden infant death syndrome during the first year of life per 100,000 baby-years of follow up.
 - (d). The percentage of infants weighing less than 2500 grams at birth.
 - (e). The lifetime risk of breast cancer.
3. State which observational study design is best (that is, most efficient and logical) in each of the following scenarios: (15%)
- (a). Identify the cause of a rare disease
 - (b). Identifying the long-term effects of a rare exposure
 - (c). Studying the health effects of an exposure for which information is difficult and expensive to obtain
 - (d). Identifying the causes of a new disease about which little is known
 - (e). Identifying the short-term health effects of a new exposure about which little is known.

4. Briefly define each of the following biases and state the different ways that each of the biases can be minimized: (15%)
 - (a). Selection bias
 - (b). Misclassification

5. Briefly describe an ecologic study and indicate its main limitation. (15%)

6. Please describe the main similarities and differences between each of the following: (15%)
 - (a). Prevalence and incidence
 - (b). Incidence rate and cumulative incidence
 - (c). Fixed and dynamic population

7. Why are point prevalence rates useful in epidemiology? Please list possible factors which may lead to either an increase or decrease in the prevalence rate. (20%)