

**Part I. Question 1 to 10, please choose the answer closest to the underlined word or phrase. One Answer Only. 2 points each.**

1. Leaders of the world's largest economies are close to an agreement to tackle the global financial crisis.  
(A) fight (B) meditate (C) forbid (D) deal with
2. I think people realize the economy seemingly fell off the cliff.  
(A) inclined (B) caught up (C) help up (D) slumped
3. In the future, globalization is going to be increasingly driven quickly to its processes and technologies, and start to march forward.  
(A) directed (B) motivated (C) forced (D) manipulated
4. The home team kicked off the season with an easy win.  
(A) interrupted (B) commenced (C) avoided (D) complicated
5. The use of stem cells is controversial - opponents object on the grounds that it is unethical to destroy embryos in the name of science.  
(A) adversaries (B) allies (C) forerunners (D) associates
6. Slumdog Millionaire is about a Mumbai teen who grew up in the slums, becomes a contestant on the Indian version of "Who Wants To Be A Millionaire?"  
(A) asylum seeker (B) gangster (C) youngster (D) homeless
7. Critical listening is a difficult kind of listening because it requires you to both interpret and evaluate the message.  
(A) understand (B) integrate (C) intrigue (D) compose
8. He is worried about a potential quiz tomorrow.  
(A) possible (B) actual (C) providential (D) surprising
9. These two girls prefer to have intimate conversation one-on-one  
(A) personal (B) secret (C) intelligent (D) discreet
10. His position was contrary to that of the teacher's  
(A) puzzling (B) opposite (C) compatible (D) foreseeable

**Part II. Question 11-15, please choose the answer that best completes the sentence. Question 16-20, please choose the best answer to fill each of the numbered blanks in the passage.**

In many countries, it is considered 11 to appear naked or even half-naked on a public beach. However, some places often have a few 12 beaches that are designated as nudist or "clothing optional" beaches, where uninhibited people can fully 13 themselves to the sun. Other countries, especially those where 14 are hot and attitudes are 15, impose no restrictions at all, so people may sunbathe topless or nude even on the public beaches.

11. (A) inappropriate (B) interesting (C) conservative (D) considerate
12. (A) inclusive (B) executive (C) secluded (D) acceptable
13. (A) demonstrate (B) expose (C) lie down (D) externalize
14. (A) seawater (B) cuisine (C) fashion (D) climates
15. (A) strict (B) sincere (C) liberal (D) general

There are many different forms of potential economic stimulus and they work in different ways. Tax cuts for individuals generally encourage short-term spending. Tax cuts for companies encourage both spending and investment. Expenditures on public works create contracts for firms and provide short- to medium-term 16. Investments in research and development take a longer-term approach 17 the theory 18 in the future (and thus provide jobs) if they have the money to make intelligent investments in their operations

now. Finally, some forms of economic stimulus seek to make investments that will pay off in the long run 19 for everybody. An example is investing in the U.S. energy grid. 20, a one-time outlay could make energy costs for both individuals and businesses less expensive for decades to come.

16. (A) opportunities of employment (B) employment opportunities  
 (C) employing opportunities (D) employment in opportunities
17. (A) under (B) in (C) of (D) on
18. (A) business is going to be thrive (B) which business is going to be thrive  
 (C) that business will thrive (D) business thrives
19. (A) with cheaper consumption (B) in making cheaper consumption  
 (C) by consuming cheaply (D) by making consumption cheaper
20. (A) Theoretic concern (B) Theoretical (C) Being theoretic (D) Theoretically

**Part III. Reading Comprehension. In this part, you will read several passages. Each one is followed by one question or a number of questions. Question 21 – 40, you should choose the ONE best answer to each question. 2 points Each.**

**Question 21-25**

The importance of strength in many sports is undeniable. It is so important that many university and professional teams now hire a specialized coach who only attends to the development of strength in athletes. It is interesting to note that no such specialist is hired to attend to the other components of physical fitness. We have yet to see a cardiovascular coach, a coach who attends to developing fitness of the heart and blood vessels, hired by universities or professional teams. This situation raises the question of the relative importance of each of these two components, strength training and cardiovascular training, to the other. Does the strength coach develop the cardiovascular system by prescribing a program to increase muscle fiber?

It is theoretically possible to design a weight-lifting program in which the resistance is so low and the repetitions so numerous that it provides the cardiovascular benefits of a running program. Therefore, if you view weights as a way to overload muscles, you can imagine a continuum of programs that emphasize cardiovascular benefits on the one extreme and strength on the other. The practical truth of the matter is that most coaches are primarily concerned with pure strength. Therefore, the athlete has to work on the end of the weight-overload continuum that promotes little, if any, cardiovascular benefit. In fact, one study has found that a high-intensity strength program reduced mitochondrial density (density of the cellular structures that produce energy in the muscle fiber) per unit of muscle. The athletes increased muscle mass, so they did not eliminate mitochondria presumably, but the fact remains that the oxidative capacity, the ability to use oxygen in the synthesis of energy, was not promoted. Oxidative capacity would usually improve in programs that stress cardiovascular conditioning. Neither increased blood flow nor increased mitochondrial density (both indicators of oxygen extraction) occur with strength training.

Obviously, there is nothing wrong with training athletes to gain strength, but in most strength programs cardiovascular improvements are not made. Therefore, for athletes, who require both strength and cardiovascular conditioning, both components must be trained independently.

21. What is the main point of the passage?
- (A) College and professional teams do not need specialized coaches.  
 (B) Strength training should be replaced by cardiovascular training.  
 (C) Cardiovascular training is more difficult than strength training.  
 (D) Athletes need both strength and cardiovascular training.

22. Under which of the following conditions can a weight-lifting program provide cardiovascular benefits?
- (A) When the weights are very heavy
  - (B) When the weights are lifted very slowly
  - (C) When lifting a heavy weight overtires the muscles
  - (D) When light weights are lifted a large number of times
23. Why does the author mention running?
- (A) To give an example of the benefits of strength training
  - (B) To demonstrate what a typical weight program includes
  - (C) To give an example of an activity that provides cardiovascular conditioning
  - (D) To demonstrate the importance of oxygen extraction
24. Which of the following is an important direct result of cardiovascular training?
- (A) Improved oxidative capacity
  - (B) Increased muscle fiber
  - (C) Decreased mitochondrial density
  - (D) Increased body weight
25. Which of the following policies would the author be most likely to support?
- (A) Sports teams should increase their strength-training programs.
  - (B) All athletes should be able to choose the kinds of training they prefer.
  - (C) Sports teams should provide improved cardiovascular training.
  - (D) All athletes should avoid strength training in order to avoid injury.

**Question 26-31**

It is in search of adequate food supplies that cetaceans, marine mammals such as whales and dolphins, travel the oceans. They live in a world that is largely hidden from humans. Yet their range is three times as large as ours, since oceans occupy about three-quarters of the Earth's surface. They travel through well-marked ocean zones, **each** with its own characteristic marine life. They glide through the water, periodically rising to the surface to breathe. The sea may be raging but cetaceans are untroubled by the greatest storms; indeed they are more at home in rough than in calm seas.

Indirectly, however, their life is greatly influenced by wind. The eastward rotation of the Earth produces the **prevailing** trade winds, blowing east to west at the equator. These winds drag the surface waters and all they contain in a westerly direction. Warmed by its passage through the tropics, the wind-driven water is deflected against the westward continents, turning southwest in the Southern Hemisphere and northwest in the Northern Hemisphere.

In the Southern Hemisphere, the warm flow of tropical water under the west-going equatorial trade wind produces a genial climate along the eastern shores of Australia, South America, and South Africa. But there is open ocean to the south. Here the current is driven eastward unimpeded by land before the almost incessant westerly gales of this zone. The huge mass of water moves fast, chilled by water from the Antarctic Region, but **laden** with masses of plankton.

This cold, swift current is **split** when it strikes the southwestern extremities of the three southern continents. The northern portion of this water is diverted by the southwest coast of South America to sweep northward toward the equator. Known as the Humboldt Current, this current is rich in plankton on which cetaceans feed. Part of this same cool eastward-flowing current, enriched with water from higher latitudes, is similarly diverted north along the southwest coast of South Africa. This is the Benguela Current, where many cetaceans come to feed.

26. The passage answers which of the following questions?
- (A) What is the main difference between cetaceans and other marine life?

- (B) How far do most cetaceans travel in a year?  
(C) How often do cetaceans need to breathe?  
(D) What winds and ocean currents affect cetaceans?
27. The word **each** in paragraph 1 refers to a  
(A) cetacean (B) surface (C) range (D) zone
28. The word **prevailing** in the passage is closest in meaning to  
(A) arctic (B) blowing (C) dominant (D) energetic
29. The word **laden** in paragraph 3 is closest in meaning to  
(A) balanced (B) filled (C) touched (D) wrapped
30. The word **split** in paragraph 4 is closest in meaning to  
(A) stopped (B) divided (C) opened (D) surrounded
31. What do paragraphs 3 and 4 primarily discuss?  
(A) The water currents in the Southern Hemisphere  
(B) The trade winds in the Southern Hemisphere  
(C) The three continents in the Southern Hemisphere  
(D) The large area of open ocean in the Southern Hemisphere.

**Question 32-36**

Doris Lessing received her Nobel Prize in 2007. Her novel *The Golden Notebook* is considered a feminist classic by some scholars, but notably not by the author herself, who later wrote that its theme of mental breakdowns as a means of healing and freeing one's self from illusions had been overlooked by critics. She also regretted that critics failed to appreciate the exceptional structure of the novel. As she explains in *Walking in the Shade*, Lessing modeled Molly, to an extent, on her good friend Joan Rodker, the daughter of the author and publisher John Rodker.

Lessing does not like the idea of being pigeon-holed as a feminist author. When asked why, she replies:

What the feminists want of me is something they haven't examined because it comes from religion. They want me to bear witness. What they would really like me to say is, 'Ha, sisters, I stand with you side by side in your struggle toward the golden dawn where all those beastly men are no more.' Do they really want people to make oversimplified statements about men and women? In fact, they do. I've come with great regret to this conclusion.

- Doris Lessing, *The New York Times*, 25 July, 1982[8]

32. Doris Lessing is a Nobel Prize winner in  
(A) Feminism. (B) Literature. (C) Sociology. (D) Peace.
33. According to Doris, what feminists want from her is  
(A) exceptional structure. (B) fighting against men.  
(C) creative ideas about men and women. (D) healing power from battles between men and women.
34. Doris Lessing does not particularly like the idea of being **pigeon-holed** as a feminist; pigeon-holed here means  
(A) categorized (B) wholesale (C) viewed (D) completed
35. Which of the following statements is **FALSE**?  
(A) Critics often neglect the theme of mental breakdowns as a self-freeing power.  
(B) She models a heroine on her friend in one of her books.  
(C) Her book *The Golden Book* is particularly considered a feminist one by Lessing.  
(D) Lessing thinks critics understand her work very well.
36. Generally speaking, Lessing's attitude towards being considered a feminist is  
(A) accepting (B) disappointed (C) welcomed (D) patient

**Question 37-40**

In recent years, many Taiwanese have won awards at international film festivals. However, many theater owners don't consider even prize-winning Taiwanese films to have much commercial potential in their home market. Their viewpoint is generally confirmed by the largely empty seats at showings of locally produced movies. The market share for local films is only about two percent, while more than 95 percent of the market is taken by Hollywood blockbusters. The dominance of American-made films in Taiwan has continued for the past ten years, but the government is proposing some solutions. It is hoped that some legal changes and few promotional projects will help Taiwan's struggling film industry.

One proposal is to give individuals or companies a tax deduction for money spent to produce a film. The idea is that the tax deduction would encourage investments in new films. There are also plans to provide financial support not only for film production, but also for marketing.

37. Which of the following could be a title for this passage?

- (A) The international Movie Industry and Taiwanese Films
- (B) Trends in Taiwanese Moviegoing Habits
- (C) Prize-Winning Taiwanese Films
- (D) A Helping Hand for the Taiwanese Film Industry

38. Which of the following statements is true about Taiwanese films in general?

- (A) They have been commercially successful both locally and abroad.
- (B) Most production of local films has been moved to Hollywood.
- (C) They have won many international awards, but little response from local audiences.
- (D) They have found little success anywhere in the world.

39. What does the passage imply is the main reason that Taiwanese films do not have a large local audience?

- (A) Taiwanese audiences dislike prize-winning films, thinking them "arty."
- (B) American films are superior in quality.
- (C) The Taiwanese film industry is not supported well enough financially.
- (D) Ticket prices for local films are too high.

40. How is the government attempting to help the local film industry?

- (A) By limiting the number of foreign films that local theater owners can show.
- (B) By encourage lower ticket prices for local films.
- (C) By establishing schools for training local filmmaking talent.
- (D) By helping to make creating and promoting local films more affordable.

**Part IV. Essay. 20 points.**

**Do you think that technology alienate people from one another? Why or Why not? Please write a well-structured essay in 150 to 200 words discussing your opinions.**

問答題，共七題

1. 請任列舉兩種細胞內的胞器 (Organelle) 並簡述其結構特徵及主要功能。(15 分)
2. 請簡述並圖示肌節 (Sarcomere) 的結構與組成。(15 分)
3. (1) 何謂腹膜 (Peritoneum)?  
(2) 何謂腹膜內器官 (Intraperitoneal organ) 及腹膜後器官 (Retroperitoneal organ)?  
(3) 在腹腔中，哪些器官是屬於腹膜內器官，哪些是屬於腹膜後器官?(共 15 分)
4. 請簡述精子 (Sperm) 從精子生成 (Spermatogenesis) 到運送離開體內所需經過的路徑或結構。(10 分)
5. 請簡述並圖示一個典型脊椎骨 (Vertebra) 的結構特徵。(10 分)
6. 請比較交感神經 (Sympathetic nerve) 和副交感神經 (Parasympathetic nerve) 的異同。(20 分)
7. 請簡述參與肘關節 (Elbow joint) 運動主要的肌肉及這些肌肉的神經支配。(15 分)

選擇題，請選一最佳答案，每題2分。

- ( ) 1. 細胞內包器(organelle)與內涵體 (inclusions)何者無膜？ (A) 溶小體 (B) 高爾基體 (C) 顆粒性內質網 (D) 肝醣
- ( ) 2. 細胞內包器何者具雙層膜？ (A) 粒線體 (B) 溶小體 (C) 過氧化氫體 (D) 高爾基體
- ( ) 3. Cytosol 是指 (A) 細胞質 (B) 染色質 (C) 核質 (D) 細胞溶質
- ( ) 4. 下列何者分布於表皮細胞與節締組織之間？ (A) cilia (B) gap junctions (C) hemidesmosome (D) tight junctions
- ( ) 5. 細胞內骨架何者中空？ (A) 微小管 (B) 中間細絲 (C) 微細絲 (D) A, B, C 3者無無
- ( ) 6. 基本組織中單位面積中細胞核密度最少？ (A) 上皮組織 (B) 結締組織 (C) 肌肉組織 (D) 神經組織
- ( ) 7. 臟層心包(心外膜)是屬於下列何者？ (A) 皮膜 (B) 黏膜 (C) 漿膜 (D) 滑膜
- ( ) 8. 以下組織中何者其”細胞外物質，非細胞物質”的組成最多？ (A) 陰道上皮 (B) 肌腱 (C) 心肌 (D) 膀胱上皮
- ( ) 9. 乳腺是何種分泌方式？ (A) 部分洩出的 (B) 頂端洩出的 (C) 全洩出的 (D) 部分洩出與頂端洩出等比例混合型
- ( ) 10. 黏著斑(macula adherens)的細胞膜內側細胞質面，有何種主要細胞骨架附著？ (A) 微細絲 (B) 中間細絲 (C) 微小管 (D) 無細胞骨架
- ( ) 11. 脾臟內主要的節締組織纖維？ (A) 膠原 (B) 彈性 (C) 網狀 (D) 膠原彈性混合型
- ( ) 12. 蜂窩組織 (areolar tissue) 的纖維主要是由下列何者分泌？ (A) 脂肪細胞 (B) 成纖維細胞 (C) 巨噬細胞 (D) 漿細胞
- ( ) 13. 一條神經內，個別神經纖維，外包有？ (A) 神經內膜 (B) 神經中膜 (C) 神經外膜 (D) 被囊
- ( ) 14. 下列何者不是神經膠細胞？ (A) 星狀膠細胞 (B) 寡突膠細胞 (C) 微小膠細胞 (D) 神經幹細胞
- ( ) 15. 下視丘神經元來的軸突進入？ (A) 腦下腺前葉 (B) 腦下腺中葉 (C) 腦下腺後葉 (D) 腦下腺下葉
- ( ) 16. 肌細胞釋放的激素？ (A) 雄性素 (B) 心房利尿素 (C) 腎上腺素 (D) 濾泡刺激素
- ( ) 17. white adipose tissue 與下列何者最類似？ (A) gland (B) nervous (C) areolar (D) bone
- ( ) 18. muscle cell內充滿的包器？ (A) microfilaments filaments (B) rough ER (C) peroxisomes (D) intermediate filaments
- ( ) 19. 固有節締組織connective tissue proper 中含有sponge-like molecules可儲存 tissue fluid (A) ground substance (B) extracellular matrix (C) reticular fibers (D) capillaries

- ( ) 20. 下列構造中何者管徑(diameter)最大? (A) secondary bronchi (B) respiratory bronchioles (C) alveolar ducts (D) alveoli
- ( ) 21. The layer of connective tissue underlying the epithelium of the mucosa of the GI tract is called the \_\_\_\_\_. (A) adventitia (B) lamina propria (C) submucosa (D) peritoneum
- ( ) 22. Simple columnar epithelium is a lining of the following organs **except** (A) esophagus (B) stomach (C) small intestine (D) large intestine
- ( ) 23. The \_\_\_\_\_ of the stomach is/are responsible for the production of gastric juice. (A) rugae (B) gastric glands (C) fundus (D) serosa
- ( ) 24. Which of the following is an anatomical feature of the small intestine that serves to increase the surface area for digestion and absorption? (A) lacteals (B) mucosa (C) rugae (D) microvilli
- ( ) 25. Production of defensins by? (A) Enterocytes (B) Goblet cells (C) Paneth cells (D) enteroendocrine cells

問答題

1. 胰臟分泌 enzyme 則其細胞內明顯特徵為何? 請繪圖說明包器與其功能。10分。
2. 請繪圖說明兩種淋巴器官並說明其顯微鏡下明顯特徵。20分。
3. 請繪圖說明兩種內分泌器官(pure endocrine organ)並說明其顯微鏡下明顯特徵。20分。



1. 列舉說明引起非洲睡眠病(African sleeping sickness)的兩種不同致病原所導致的疾病的地理分布及臨床症狀的差異性(10%)。
2. 說明弓蟲(*Toxoplasma gondii*)的生活史、人體的感染途徑及其對於人體所產生的疾病(10%)。
3. 列舉說明兩種自由生存的阿米巴(free-living amoeba)的生活史、對於人體所產生的疾病及其流行病學(10%)。
4. 列舉說明兩種寄生在人體的瘧原蟲(*Plasmodium* sp.)的致病機轉及臨床症狀(10%)。
5. 列舉三種會寄生在人體的條蟲(Cestode)的成蟲及蟲卵的特徵(10%)。
6. 描述豬肉囊蟲症(*Cysticercus cellulosae*)的感染途徑及致病機轉(10%)。
7. 描述中華肝吸蟲(*Clonorchis sinensis*)、泰國肝吸蟲(*Opisthorchis viverrini*)及貓肝吸蟲(*Opisthorchis felineus*)的實驗診斷依據及其流行病學的異同處(10%)。
8. 描述血吸蟲(*Schistosoma* sp.)的生活史、人體的感染途徑及致病機轉(10%)。
9. 列舉說明內臟幼蟲移行症(Visceral larva migrans)及表皮幼蟲移行症(Cutaneous larva migrans)的致病原及疾病的主要診斷依據(10%)。
10. 列舉說明兩種不同的絲蟲(filariae)感染人體的途徑及對於人體所產生的疾病(10%)。

1. 細菌如何逃避宿主的免疫清除? (15 分)
2. 請說明細菌抗藥性基因之傳播機制? 革蘭氏陰性菌較革蘭氏陽性菌抗藥性高, 原因何在? (10 分)
3. 請說明抗原(antigen)與超級抗原(superantigen)有何不同? (10 分)
4. 肺結核分枝桿菌抗藥性問題日趨嚴重, 請問 MDR(multiple drug resistance) 及 XDR(extensive drug resistance)的定義為何?並說明結核病防治困難之可能原因? (15 分)
5. 利用分子生物技術偵測病原體之方法有那些? 其原理為何? 優點為何?(15 分)
6. 胃幽門桿菌 (*Helicobacter pylori*) 之診斷方法有那些?其感染有關之疾病為何? (10 分)
7. 請說明內毒素 (endotoxins) 及外毒素 (exotoxins) 的區別, 並且各舉出一個例子來說明在細菌致病的過程中, 這些毒素分別對於寄主引發疾病的機轉? (15分)
8. 請說明樹突細胞(dendritic cell)在免疫反應之角色? (10分)

臨床微生物

1. 試述腸病毒的特性及實驗室診斷 (15%)
2. 試述流行性感冒病毒的特性及實驗室診斷 (10%)
3. 試述幽門桿菌的特性及實驗室診斷 (15%)

血液部份

1. 假若有一位學生在戶外突遭蛇咬，經描述及圖像比對後認為此蛇毒將會造成溶血效應，為了取得實驗室證據，請問：
  - (a) 該做哪些常見之檢驗項目及其結果應如何才得以證實之？(至少 4 項)(8%)
  - (b) 在上述四項檢驗項目中，何者是最早出現異常且最具敏感性之檢驗項目？(2%)
  - (c) 請簡述此蛇毒引起溶血造成上述四項檢驗項目結果異常之機轉？(5%)
  
2. 糖尿病(DM)病人常是發生瀰漫性血管內凝血(DIC)之高危險群，請問：
  - (a) 如何獲悉一位 DM 病人正處於 DIC 危險中--請敘述該監控哪些常見之檢驗項目及其結果應為何？(至少 7 項)(7%)
  - (b) 為何 DM 病人會發生 DIC 呢--請簡述其機轉？(8%)

- (1) 當你在確認並準備發報告時，發現有一份報告的 potassium (鉀) 數值為 7.5 mmol/L，你認為有哪些情形會造成這種結果？你將如何處理這份報告？(5 分)
- (2) 當你看到這樣一份報告：Estradiol < 20 pg/mL，FSH：80 mIU/mL，LH：60 mIU/mL，其他生化檢查數值都正常。你認為該病人處於何種狀態？日後該注意哪些疾病的發生，其相關的檢查為何？(10 分)
- (3) 請利用下列數據計算 Anion gap (陰離子間隙差)，並就該病人的檢體採集注意事項與可能之臨床表現和診斷進行討論。(15 分)  
Random plasma glucose：89 mg/dL，BUN：78 mg/dL，Creatinine：8.1 mg/dL，  
Na<sup>+</sup>：135 mmol/L，K<sup>+</sup>：3.5 mmol/L，Cl<sup>-</sup>：105 mmol/L。  
Arterial blood gas：pH：7.28 (7.35~7.45)，pCO<sub>2</sub>：24 mmHg (34~45 mmHg)，pO<sub>2</sub>：90 mmHg (83~108 mmHg)，HCO<sub>3</sub><sup>-</sup>：12 mmol/L (21~28 mmol/L)

## 一、解釋名詞：(20%)

1. Loss of heterozygosity
2. Wobble hypothesis
3. Complementation test
4. Crossing-over
5. Cistron
6. Satellite DNA
7. Heterochromatin vs. euchromatin
8. Chaperone
9. Imprinting
10. Operon

## 二、選擇題：(單、複選皆有，複選者有註明)：(20%)

1. 請問下列哪一條 PCR primer 的 annealing 溫度最高? 1) TACCTTAAGCAATGTCA  
2) AGCCTGCCACAGCGTCG 3) TTATGACTTGAATACTG 4)  
GACCTCATATGACATAG
2. (複選)請問下列哪幾種 DNA 的突變會造成蛋白質序列的改變? 1) silent mutation 2)  
frameshift mutation 3) nonsense mutation 4) missense mutation
3. (複選)請問下列哪些物種有細胞核? 1) *Saccharomyces cerevisiae* 2) *Escherichia coli*  
3) *Homo sapiens* 4) Viroid 5) Prion
4. (複選)真核細胞的遺傳物質會存在於哪些位置? 1) centrosome 2) chloroplast 3)  
mitochondria 4) nucleus 5) ribosome
5. (複選)分光光度計(spectrophotometer)可用來作核酸定量，其原理何者為真? 1)  
DNA 可吸收 260 nm 波長 2) RNA 可吸收 260 nm 波長 3) DNA 可吸收 280 nm 波  
長 4) RNA 可吸收 280 nm 波長 5) protein 可吸收 280 nm 波長
6. 下列分子由大到小排列應為：1) cosmid > phagemid > BAC > YAC 2) BAC > YAC  
> cosmid > phagemid 3) YAC > BAC > cosmid > phagemid 4) phagemid > cosmid >  
YAC > BAC
7. (複選)下列哪些為蛋白質轉譯(translation)時會使用的序列 1) Shine-Dalgarno  
sequence 2) Kozak sequence 3) IRES 4) Okazaki fragment
8. 在人類細胞中，下列哪一個不是 termination codon? 1) UAG 2) UUG 3) UAA 4)  
UGA
9. 下列哪一個分子不是 DNA 複製時所需? 1) DNA polymerase 2) helicase 3) DNA  
ligase 4) primase 5) TBP
10. DNA 複製時的正確性主要由何分子控制? 1) DNA polymerase 2) helicase 3)  
DNA ligase 4) primase 5) TBP

## 三、配合題：(10%)

各種代表性物種的基因組(genome)大小。請從右列(in base pair)中選擇適合的答案。

- |  |                       |
|--|-----------------------|
| ___ A. <i>Caenorhabditis elegans</i>   | (1) $1.0 \times 10^6$ |
| ___ B. <i>Drosophila melanogaster</i>  | (2) $4.2 \times 10^6$ |
| ___ C. <i>Escherichia coli</i>         | (3) $1.3 \times 10^7$ |
| ___ D. <i>Homo sapiens</i>             | (4) $8.0 \times 10^7$ |
| ___ E. <i>Saccharomyces cerevisiae</i> | (5) $1.4 \times 10^8$ |
|  | (6) $1.2 \times 10^9$ |
|  | (7) $3.3 \times 10^9$ |

## 四、問答題：(50%)

1. 請說明 gene, allele, genotype, phenotype 間之關係為何? (8%)
2. 請說明 siRNA, shRNA, microRNA, antisense RNA 在功能、構造、作用方式、及來源方面的異同。(10%)
3. 請畫出 gene structure in human genome, 和其所轉錄(transcription)出之 RNA structure, 以及蛋白質產物間之結構與序列對應關係。(接下題)(8%)
4. 接續上題, 請自基因開始到其產物功能, 闡述真核細胞基因表現有哪些不同層次的調控方式。(兩題可同時作答, 也可分開作答)(12%)
5. 配置 0.5 M 之氯化鈉(NaCl, molecular weight: 58.5)溶液 1 公升, 請問 1)需用多少公克氯化鈉? 2)此氯化鈉溶液以重量體積比表示應為? 3)此溶液含有多少莫耳數(mole)之氯化鈉? (6%)
6. 試管內有 3.3  $\mu\text{g}$  之 5 kilo-base pair 的 plasmid, 請列式計算出試管內共有多少個 plasmid 分子? (assuming the average molecular weight of nucleotide: 330) (6%)

1. 試述動脈粥狀硬化(Atherosclerosis)的病生理機制 (10%)
2. 試述細胞週期(cell cycle)中各個 phase 執行的工作並說明如何做偵測 (10%)
3. 試以臨床上的例子，說明 Positive feedback 的重要性 (10%)
4. 病人有某種蛋白質(如蛋白激酶)功能的缺失時，他的問題可能出自於哪幾個層面的異常? 分別如何做確認? (10%)
5. 胰島素受體基因剔除會導致小鼠嚴重生長遲滯且出生不久後死亡，若剔除 IRS-1 (insulin receptor substrate-1)基因則引起輕微生長遲緩及胰島素抗性(insulin resistance). 針對此研究結果，你會做何結論? 如何進一步探討胰島素作用的分子機制? (15%)
6. 試舉例說明基因選殖(gene clone), 基因降減(gene knock-down), 及基因過度表現(gene overexpression)在生理及醫學研究的應用 (15%)
7. 請說明你對哪一個領域的醫學研究特別有興趣，請敘述緣由並提出目前亟待解決的問題 (15%)
8. 試以自己提出的問題，根據已有的研究背景提出一個假設，並設計一個實驗來印證或考驗自己的假設 (15%)



問答題

1. 何謂平均餘命？並說明平均餘命在公共衛生上所代表的意義？(15%)
2. 請說明以下名詞之意義 (18%)

Mortality,

Morbidity,

Incidence,

Prevalence,

Age specific mortality,

Standardized mortality ratio

3. 人口老化是全世界面臨的問題, 台灣亦然, 如何有效提供長期照護將是我國公共衛生的重要挑戰, 請問長期照護的定義為何? 及其服務內容包括那些? (20%)
4. 何謂三段五級? 並說明如何運用三段五級的預防模式, 來防制「事故傷害」的發生。(27%)
5. 請將公共衛生(Public Health)、衛生教育(Health Education)與健康促進(Health Promotion)各名詞作說明及比較。(20%)