

Part I. Question 1 to 10, you should choose the answer closest in meaning to the underlined word or phrase. **One answer only.** 2 points each.

- Regarding the presidential campaign, he does not see eye to eye with his wife.
(A) have any affection for (B) have any interest (C) agree with (D) show any passion as
- He suffered a massive hemorrhage and was immediately sent to the hospital.
(A) severe (B) compact (C) critical (D) immense
- A novel idea suddenly came to her mind, she immediately went to see her boss.
(A) imaginary (B) new (C) developed (D) realistic
- The voters opted for this presidential candidate because he promised to reduce taxes.
(A) chose (B) forgave (C) opposed (D) advocated
- He was put through university with money left by his grandfather.
(A) was admitted to (B) successfully finished (C) gave a mission to (D) carried a responsibility for
- The lectures in our university are quite liberal and broad minded.
(A) preeminent (B) obsessed (C) renowned (D) permissive
- In *Sense and Sensibility*, one sister ends up in a happy marriage while the other loses her first suitor and must fall back on a boring alternative suitor.
(A) fail to accomplish (B) slip and hit the ground (C) change seasons (D) accept a second choice
- University of California report warns that unless China radically changes its energy policies, its increases in greenhouse gases will be several times larger than the cuts in emissions being made by rich nations under the Kyoto Protocol.
(A) oil consumption (B) discharge of smoke (C) production of coal (D) energy saving
- As a spectator, it's quite easy to pick holes in other people's work.
(A) come up with (B) keep pace with (C) get even with (D) find fault with
- The students in our school are predominantly from the South.
(A) mostly (B) scarcely (C) particularly (D) partially

Part II. Question 11-15, please choose the answer that best completes the sentence. Question 16-25 you should choose the best answer to fill each of the numbered blanks in the passage. **One answer only.** 2 points for each.

The media [of an increasing number of surgical makeovers] says a lot about Korea's own 11 makeover. Not long ago, many people saw the country as a decidedly uncool industrial park pumping out cheap cars and appliances. But that started to change in the late 1990s, when the Korean government decided that entertainment could be an export industry. The film business in particular 12 government help and a big influx of private capital...

The popularity of Korean stars is 13 Korean 14 features as a standard of beauty across the region. Some sociologists see a subtext in the craze: a rebellion by Asian people against the images of Caucasian good looks that 15 much of the international trend.

- (A) country (B) image (C) race (D) medicine
- (A) benefitted from (B) inherited (C) messed up with (D) suffered from
- (A) naturalizing (B) blurring (C) establishing (D) diminishing
- (A) ethnic (B) export (C) prominent (D) legendary
- (A) export (B) in charge (C) take over (D) dominate

Question 16 -18

The topic of thought is one area of psychology, and many observers have considered this aspect in connection with robots and computers: Some of the old worries about AI (artificial intelligence) 16 the question of

whether computers could think. The first massive electronic computers, capable of rapid (if often unreliable) computation and little or no creative activity, were soon dubbed 'electronic brains.' A reaction to this terminology quickly followed. 17, computers were called 'high-speed idiots,' and effort to protect human vanity. In such a climate, the possibility of computers actually 18 was rarely considered: It was bad enough that computers might be capable of thought.

16. (A) link closely to (B) is linking closely to (C) have close linked (D) be closely linked
17. (A) Putting them in their place (B) They are in their place
(C) To put them in their place (D) With putting them in their place
18. (A) being alive (B) could be alive (C) which alive (D) are alive

Question 19-20

The average American produces about 20 tons of the major greenhouse gas carbon dioxide (CO₂) every year. That might sound like a lot — and Americans do have among the biggest carbon footprints in the world — but the entire world emits around 27 billion tons of CO₂ each year, 19 transportation, electricity use, deforestation. Look at those numbers for a moment, and you'll realize there's very little that any of us can do on an individual level to stop climate change. Live like a monk, take away your 20 tons — stop breathing if you'd like — and you'll 20 scratch the surface.

19. (A) by (B) in (C) through (D) with
20. (A) often (B) barely (C) strongly (D) constantly

Question 21-25

Why do Mickey Mouse, Ronald McDonald, and Superman have 21? They are all easily identified and powerful symbols of what some people call American 'cultural imperialism.' Most Americans would be surprised that these beloved cultural icons are often unwelcome by many overseas.

The cries of cultural imperialism are a 22 phenomenon. 23 western colonial empires in Asia, Africa and South America, nationalists in the newly independent countries often became outraged over the staying power of colonial cultures. These nationalists named the presence and domination of Western culture as 'cultural imperialism.' Paul Harrison in his book, 24, described it this way, "And so there grew up, alongside political and economic imperialism, that more insidious form of control --- cultural imperialism. It conquered not just the bodies, 25 the souls of its victims."

21. (A) in general (B) in this respect (C) in common (D) in short
22. (A) relatively recent (B) recently relative (C) relative recent (D) recent relative
23. (A) In order shrink of (B) Shrinking of (C) Upon shrinking of (D) With the shrinking of
24. (A) is called *Inside the Third World* (B) *Inside the Third World*
(C) who writes *Inside the Third World* (D) that names *Inside the Third World*
25. (A) and (B) so (C) as (D) but

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

Why don't people consult an herbalist and take his advice instead? One reason is that only a few herbalists have made a thorough analysis of herbal medicine. Most of the time, some herbalists don't know what makes up the herbal medicine they are prescribing. It is not uncommon that some people, especially young children, may suffer great pain because the herbal medicine qualifications of some herbalists are sometimes called into question. Some

of them have never received enough formal medical education. At best, they have just passed a test, which is given to make sure that they know the names of certain herbal drugs and their composition; at worst, they are no more than quacks. Finally, few large-scale experiments with herbal drugs are conducted.

Yet some people still ask herbalists for advice. They do so when doctors declare that no chemical medicine can treat a certain disease. Under the circumstances, people may gamble with their own lives, acting human guinea pigs for herbalists.

26. According to this passage, people may take herbs like ginger for several reasons. Which of the following is NOT one of them?

- (A) The herbs are cheap and easy to come by. (B) Their illness may not be serious enough
(C) The herbs may taste good (D) The herbs may really help them recover

27. In this passage, three reasons are given to explain why people won't go to see an herbalist. Which of the following is NOT one of them?

- (A) Qualification tests are not credible. (B) Herbalists are poorly educated
(C) Experiments are not widely conducted. (D) The components of herbal medicine are poisonous.

28. By saying "people may gamble with their own lives," the author suggests that it is _____ to ask an herbalist for advice.

- (A) sensitive (B) inevitable (C) risky (D) expensive

29. According to this passage, people may go to see an herbalist when their illness is _____.

- (A) unknown (B) incurable (C) infectious (D) serious

In the past, writing was considered exclusive and time-consuming. The advent of the printing press popularized the written word and ushered in the gradual rise in global literacy. The speed and legibility of writing was greatly improved by the typewriter. But all of these were eclipsed when the personal computer came of age as the standard tool for writing. But what new dimensions and drawbacks, if any, does it offer?

30. The expression 'ushered in' is closest in meaning to _____.

- (A) hindered (B) instigated (C) procured (D) harmonized

31. Which of the following could best replace the word 'eclipsed'?

- (A) taken over (B) redeemed (C) outshined (D) reproached

The rules of etiquette in American restaurants depend upon a number of factors: the physical location of the restaurant, e.g., rural or urban; the type of restaurant, e.g., informal or formal; and certain standards that are more universal. In other words, some standards of etiquette vary significantly while other standards apply almost everywhere. Learning the proper etiquette in a particular type of restaurant in a particular area may sometimes require instruction, but more commonly it simply requires sensitivity and experience. For example, while it is acceptable to read a magazine in a coffee shop, it is inappropriate to do the same in a more luxurious setting. And, if you are eating in a very rustic setting, it may be fine to tuck your napkin into your shirt, but if you are eating in a very rustic setting it may be fine to demonstrate a lack of manners. It is safe to say, however, that in virtually every restaurant it is unacceptable to indiscriminately throw your food on the floor. The conclusion we can most likely draw from the above is that while the types and locations of restaurants determine etiquette appropriate to them, some rules apply to all restaurants.

32. With what topic is this passage primarily concerned?

- (A) rules of etiquette (B) instructions in proper etiquette
(C) the importance of good manners (D) variable and universal standards of etiquette

33. According to the passage, which of the following is a universal rule of etiquette?

- (A) tucking a napkin in your shirt (B) not throwing food on the floor
(C) reading a magazine at a coffee shop (D) eating in rustic settings

Now scientists are beginning to find that the most sexual part of the human body is the brain and it is inherently different in men and women. Scientific literature contains abundant evidence that males and females, even when little boys and girls, fall into distinct behavioral stereotypes. But with the advent of ever more powerful brain scanners, it seems these distinctions are the result of physical differences in the chemistry and neural circuitry of the brain that are laid down at birth.

34. This passage might be from an article on

- (A) Human Revolution (B) Men and Women: Minds Apart
(C) Difference in Sexuality between Men and Women (D) The Newly developed brain scanner

35. "That men are better in target-directed motor skills, whereas women are stronger in precision manual tasks" would be a good example of _____.

- (A) behavioral distinctions between males and females.
(B) the fact that brain is inherently different in men and women.
(C) cultural influences (D) men being more capable than women

British people have mixed opinions about the Americans, reflecting the close but sometimes troubled relationship between the two nations. When people get to know Americans as individuals they have a lot more respect and affections for them than the popular, rather negative stereotype based on a casual meeting or on television programs might suggest. For many British people the US is associated with power in international politics, Hollywood, money and violence. Although Americans believe they rule the world, few of them know much about anything outside the US. The British think that money matters more than anything else to Americans, and they also think the US is a dangerous place where cannot walk in the streets or subways without fear of being attacked. Despite this, many want to go there for their holidays. And Young people generally have a much more positive attitude and love everything that comes out of America.

On the other hand, the US once belonged to Britain, and many Americans have British ancestors, so when Americans think of Britain, they think of a place that seems very familiar. Americans watch British television programs, especially period dramas, see James Bond films, and read detective stories by Agatha Christie. On the basis of these experiences, which are common even to people who are not of British origin, most Americans know more about Britain than about any other county. However, many Americans would have difficulty drawing map of Britain. They think the country consists of London and a village in Scotland where one of their ancestors came from. Every British has a servant and has great respect to the Queen. Americans admire the behavior of the British believing that they are quaint, although they themselves would never want all their social rules. British people, to them, are perfectly polite and proper, always knowing which knife and fork to use, saying "please" and "Excuse me." However, they are often conceived as being snobbish and do not seem friendly. The famous British reserve seems cold to Americans who are more used to an open enthusiastic way of communicating. Thus a result, when British say: "That's no problem" when they know that it will be a big problem, it confuses the Americans.

36. What might be a proper title for this reading?

- (A) What British people think of Americans. (B) What Americans think of British people.
(C) Great Britain, the ancestors of the Americans. (D) Cultural stereotypes.

37. What do British usually think of Americans?

- (A) They have mixed feelings. (B) They feel indifferent.
(C) They never want to have any association with American. (D) They admire everything that is American.

38. Which of the following is true about the US from British perspective?

- (A) Most Americans know a lot about the world outside the US.
(B) Few Americans know a lot about the world outside the US.
(C) Americans value power more than anything else.
(D) The US subway is the only public transportation available.

39. When Americans think of Britain, what do they usually feel?

- (A) They feel indifferent. (B) They feel annoyed.
(C) They feel familiar. (D) They never want to be associated with Britain.

40. According to the reading, which of the following is true?

- (A) American can easily draw a British map.
(B) Many Americans watch British television programs.
(C) Americans never wanted to be associated with Britain because they once belonged to Britain.
(D) Americans think only the British movie stars can have servants.

Part IV. Essay. 20 points.

Please write a well-structured essay in 150 to 200 words on the following topic:

As a global citizen, what do you think your responsibilities and rights are supposed to be? Please use examples to support your statements.

選擇題

- () 1. 以下組織中何者其「細胞外物質，非細胞物質」的組成最少？(A) 上皮組織 (B) 結締組織 (C) 軟骨組織 (D) 骨骼組織
- () 2. 有關解剖學姿勢何者為誤？(A) 身體平躺 (B) 面向觀察者 (C) 手臂置於身體兩側 (D) 手掌朝前
- () 3. 肌腱內比例最多的纖維是 (A) 膠原纖維 (B) 彈性纖維 (C) 網狀纖維 (D) 細肌絲
- () 4. 下列何者屬於乾膜？(A) 皮膚 (B) 漿膜 (C) 黏膜 (D) 滑膜
- () 5. 上皮組織如基底層是方形細胞，其上為柱形細胞則稱__上皮。(A) 複層柱形 (B) 簡單柱形 (C) 複層方形 (D) 簡單方形
- () 6. 心肌特有的特徵？(A) 中間交接盤 (B) 每一細胞僅有一細胞核 (C) 明顯橫紋 (D) A+B
- () 7. 椎間盤屬於何種軟骨組織？(A) 透明軟骨 (B) 彈性軟骨 (C) 纖維軟骨 (D) 上皮組織
- () 8. 腺體分泌後，細胞被破壞是何種分泌方式？(A) 部分洩出的 (B) 頂端洩出的 (C) 全洩出的 (D) 以上皆非
- () 9. 「神經」外包有結締組織稱為 (A) 被囊 (B) 神經內膜 (C) 神經中膜 (D) 神經外膜
- () 10. 中樞神經系統中最主要的吞噬細胞？(A) 星形膠細胞 (B) 小神經膠細胞 (C) 寡突膠細胞 (D) 室管膜細胞
- () 11. 以下組織中何者有良好血管分布？(A) 複層扁形上皮 (B) 簡單柱形上皮 (C) 纖維軟骨 (D) 硬骨
- () 12. 結締組織其基質主要是由__製造？(A) 漿細胞 (B) 成纖維細胞 (C) 肥大細胞 (D) 巨噬細胞
- () 13. 下列有關「複層鱗形上皮組織」的敘述，何者是正確？(A) 各層細胞皆是扁平狀 (B) 至少兩層 (C) 細胞各層皆可進行細胞分裂 (D) 有微血管
- () 14. 何者不屬於軟骨組織的特徵？(A) 軟骨陷窩 (B) 軟骨細胞 (C) 血管 (D) 膠原纖維束
- () 15. 骨單位(osteon)其中央管(central canal)含有？(A) 紅髓 (B) 黃髓 (C) 基質 (D) 血管與神經
- () 16. 上皮膜含有？(A) 僅上皮組織一種 (B) 上皮組織結合血管 (C) 上皮組織結合結締組織 (D) 上皮組織結合肌肉組織
- () 17. 陰道上皮是那一種類的上皮組織？(A) 簡單 (B) 複層 (C) 移行 (D) 俱纖毛
- () 18. 人類的B淋巴球是由何處產生？(A) 胸腺 (B) 闌尾 (C) 所有的淋巴組織都可以產生 (D) 骨髓
- () 19. 免疫系統內哪種細胞最先被AIDS病毒攻擊？(A) B 淋巴球 (B) 毒殺性T淋巴球 (C) 輔助型T淋巴球 (D) 輔助型B淋巴球
- () 20. 哪一構造負責回收身體右上肢和右側胸部及頭部的淋巴？(A) 腰淋巴幹 (B) 胸管 (C) 右淋巴管 (D) 乳糜池

- () 21. 皮膚皮下組織層 又稱為？(A) 表皮下層 (B) 真皮層 (C) 淺筋膜 (D) 深筋膜
- () 22. 下列何者不屬於內鼻？(A) 上鼻甲 (B) 中鼻甲 (C) 下鼻甲 (D) 內鼻甲
- () 23. 喉部軟骨中，位置最低的一塊？(A) 甲狀軟骨 (B) 會厭軟骨 (C) 環狀軟骨 (D) 小角軟骨
- () 24. 遠端小腸壁內聚集的「淋巴小結」稱為(A) 胰島 (B) 培氏斑 (C) 折皺 (rugae) (D) 絨毛
- () 25. 呼吸道哪一個部位首先進入肺組織？(A) 左支氣管 (B) 右氣管 (C) 呼吸細支氣管 (D) 肺葉支氣管
- () 26. 鼻中隔主要由 組織構成。(A) 軟骨 (B) 硬骨 (C) 骨骼肌 (D) 軟骨與硬骨
- () 27. 人類最大的唾液腺 salivary gland 是 (A) 腮腺或耳下腺 (B) 頷下腺 (C) 舌下腺 (D) 唇腺
- () 28. 空氣經過聲門會震動 產生聲音。(A) 前庭皺襞 (B) 環甲狀膜 (C) 聲帶皺襞 (D) 甲狀舌骨膜
- () 29. 最佳受精的位置是 (A) 卵巢 (B) 輸卵管 (C) 子宮 (D) 陰道
- () 30. 硬腭(hard palate) 是由上頷骨與 骨構成。(A) 額骨 (B) 鼻骨 (C) 腭骨 (D) 篩骨
- () 31. 下列何者不屬於下肢骨？(A) 跗骨 (B) 橈骨 (C) 腓骨 (D) 脛骨
- () 32. 冠狀縫是位於哪兩塊骨骼之間的纖維性關節：(A) 額骨和頂骨 (B) 頂骨和枕骨 (C) 顳骨和額骨 (D) 頂骨和頂骨之間
- () 33. 脊管裡的馬尾大約座落在那一脊柱區段以下？(A) 第七頸椎段 (B) 第五胸椎段 (C) 第二腰椎段 (D) 第一尾椎段
- () 34. 下列何者屬於球窩關節？(A) 肘關節 (B) 腕骨間關節 (C) 第一腕掌關節 (D) 髖關節
- () 35. 下列何者不是大腸的特徵 (A) 腸脂垂 (B) 結腸袋 (C) 結腸帶 (D) 絨毛
- () 36. 下列何肌肉可維持脊柱直立 (A) 橫膈膜 (B) 腹直肌 (C) 胸鎖乳突肌 (D) 直棘肌
- () 37. 下列何肌肉參與大腿彎曲的動作 (A) 股四頭肌 (B) 髂腰肌 (C) 臀大肌 (D) 內收大肌
- () 38. 下列血管中何者不會注入右心房？(A) 上腔靜脈 (B) 下腔靜脈 (C) 冠狀竇 (D) 肺靜脈
- () 39. 成人最常用來當作靜脈注射之用的血管為：(A) 大隱靜脈 (B) 正中肘靜脈 (C) 頭靜脈 (D) 小隱靜脈
- () 40. 位於恥骨聯合後面，膀胱下面的男性生殖腺體是 (A) 尿道球腺 (B) 前列腺 (C) 精囊 (D) 子宮
- () 41. 尿道連接或穿過以下的器官。何者為非？(A) 膀胱 (B) 精囊 (C) 前列腺 (D) 陰莖

- () 42. 下列哪一個臟器的動脈血來源不是來自於腹主動脈? (A) 膀胱 (B) 腎臟 (C) 脾臟 (D) 大腸。
- () 43. 心室內的肌肉稱之為: (A) 梳狀肌 (B) 腱索 (C) 心肉柱 (D) 心內膜。
- () 44. 腦部的動脈血來自於____ (A) 總頸動脈 (B) 內頸動脈及椎動脈 (C) 外頸動脈及顏面動脈 (D) 鎖骨下動脈。
- () 45. 大部分的腦神經是從何處發出? (A) 大腦 (B) 小腦 (C) 間腦 (D) 腦幹
- () 46. 食道: (A) 是中空肌肉性管子 (B) 連接咽與胃 (C) 由軟骨構造強化 (D) 受隨意與自主神經控制
- () 47. 以下構造何者不是附屬消化器官? (A) 唾液腺 (B) 脾臟 (C) 肝臟 (D) 膽囊
- () 48. 以下構造何者不是胰臟區域? (A) 頭 (B) 門 (C) 體 (D) 尾
- () 49. 大腸最靠近肝的部位是? (A) 盲腸 (B) 直腸 (C) 橫結腸 (D) 降結腸
- () 50. 黃體位在以下哪一器官內? (A) 子宮 (B) 卵巢 (C) 輸卵管 (D) 子宮頸

1. The pathologic features of Hodgkin lymphoma (based on WHO classification). (15 分)
2. The pathology of Alzheimer disease. (15 分)
3. Describe the pathogenesis and morphologic features of gastrointestinal stromal tumor. (15 分)
4. Compare the distinctive features(both macroscopic and microscopic) of Crohn disease and ulcerative colitis. (15 分)
5. The histologic findings of De Quervain thyroiditis. (10 分)
6. Compare the features of complete and partial hydatidiform mole. (10 分)
7. Describe the following terms: (10 分)
 - a. Psammoma bodies
 - b. Call-Exner bodies
8. Describe the following neoplasms: (10 分)
 - a. medullary carcinoma of breast
 - b. medullary carcinoma of thyroid gland

1. 請說明人體罹患幼裂頭條蟲症 (Sparganosis) 的途徑, 並各舉一例說明引起皮下及腦中樞的病害。(15%)
2. 圖示會引起人體非洲睡眠病 (african sleeping sickness) 的寄生蟲的生活史, 並說明不同病程引起的病害及實驗室診斷方法。(15%)
3. 請圖示感染惡性瘧 (*Plasmodium falciparum*) 及間日瘧 (*Plasmodium vivax*) 病人的體溫變化, 並說明為何體溫呈週期性變化, 以及為何兩者發燒週期會呈不同的型態。(15%)
4. 請敘述糞桿線蟲 (*Strongyloides stercoralis*) 直接及間接生活史, 那些人較易引起致命的瀰漫性感染 (dissemination infection)? (15%)
5. 請寫出四種寄生於人體腸道內的吸蟲, 及其傳染的媒介, 並舉其中一種其蟲卵超過 $100 \mu\text{m}$ 曾經在台灣流行者, 說明其生活史及造成的病害。(20%)
6. 請寫出感染人體後會引起自體感染的線蟲及原蟲各一種, 並說明如何採樣檢查及形態鑑別的根據?(10%)
7. 按下列標號將答案寫在答案紙 (每空格 2%)
 廣節裂頭條蟲 (*Diphyllobothrium latum*) 成蟲寄生於人體腸道, 蟲卵隨糞便排入水中, 孵化為 ① 後, 在水中被水蚤吃入而於水蚤中發育為 ②, ③ 吃入水蚤後發育為長尾蚴, 人體不慎吃入而感染, 成蟲頭節(scolex) 具 ④ 可吸附於腸道粘膜, 若寄生於十二指腸較易引起 ⑤ 病害。

* 注意：請於答案卷上依序作答，並標明各大題與題號

第一部份：配合題（40 分）

請自右邊選項選出最配合左邊的答案（答案請寫在答案卷上）

- 細菌及真核細胞之比較（14 分）（每小題答案可以多個）：

甲、菌體成分可與樹突細胞（dendritic cell）的 TLR4 結合	A、Gram-positive 細菌
乙、具有雙層細胞壁	B、Gram-negative 細菌
丙、具有細胞核	C、真核細胞
丁、經過 Gram stain 後，顯微鏡下呈現藍色	
戊、遺傳物質為染色體	
- T 細胞活化過程中，所需要之分子（訊息）（10 分）：

甲、T 細胞活化時需要的 signal 2 分子	A. CD40L
乙、T 細胞活化後約 24-48 小時會表現出來，導致本身 anergy 之分子	B. FasL
丙、T 細胞用來幫助 B 細胞產生抗體之 isotype switch 之分子	C. CD28
丁、調節性 T 細胞（ $CD4^+CD25^+T$ ）之專一性轉錄因子	D. CTLA-4
戊、毒殺性 T 細胞用來毒殺標的細胞（target cell）之分子	F. B7
	G. T-bet
	H. Foxp3
	I. GATA-3
- 抗病毒藥物之作用機制（6 分）：

甲、Acyclovir	A. 抑制病毒進入或是離開細胞
乙、AZT	B. 抑制核酸合成
丙、Amantidine	C. 抑制病毒的蛋白分解酵素（protease）
- 常用實驗方法之目的（10 分）：

甲、ELISA (enzyme-linked immunosorbent assay)	A. 可用來分析檢體中不同免疫細胞之比例
乙、PCR (polymerase chain reaction)	B. 可以偵測抗原或抗體之存在，並可定量
丙、Flow cytometry	C. 可以根據蛋白質分子量分開蛋白質
丁、Western blotting	D. 可以大量擴增 DNA 片段
戊、Autosequencing	F. 可以定出 DNA 的序列

第二部份：問答題

- 目前抗生素被廣泛用來控制微生物的感染，但是出現許多抗藥性菌株，請寫出目前所知的抗藥性作用機制。（10 分）
- 請說明 Type I hypersensitivity 的作用機制，並舉出 2 種代表性疾病。（10 分）
- HIV 是目前導致人類免疫不全很重要的病毒，請依序回答下列問題（16 分）：
 - 請寫出四種 HIV 的基因，並分別說明其功能。（6）
 - HIV 病毒藉由何種分子進入細胞內？（2）
 - 請說明免疫系統如何對抗病毒的感染？（8）
- 樹突細胞是很重要的抗原呈現細胞（antigen presenting cell），請依序回答下列問題：（16 分）

甲、請寫出三種樹突細胞會表現的細胞膜分子，並簡單說明其功能？（6）

乙、在周圍組織巡邏的 immature 樹突細胞與已經跑到淋巴節的 mature 樹突細胞，請比較其功能有何不同之處？（4）

丙、樹突細胞比起巨噬細胞及 B 細胞，有很好的 cross presentation 能力，請問何謂 cross presentation？這個能力對免疫功能有何幫助？（6）

5. B 細胞有嚴格的 allelic exclusion，請解釋何謂 allelic exclusion，並說明它對 B 細胞功能的影響。（8 分）

問答題:

1. 試述結核桿菌(*mycobacterium tuberculosis*)之實驗室診斷(15%)
2. 試述病毒檢驗之分離(isolation)技術(15%)
3. 試述急性骨髓性白血病(AML)之 Immunophenotyping(15%)
4. 試述多發性骨髓瘤之實驗室診斷(10%)
5. 試述生化檢查之品質管制(15%)
6. 試述脂質(lipid)之實驗室診斷(15%)
7. 試述檢驗之敏感度(Sensitivity)、特異度(Specificity)、AMR(Analytical Measurement Range)、CRR(Clinical Reportable Range)(15%)

1. 請寫出你對 biobank 的認知，及你對台灣成立 biobank 的態度及想法。
2. 許多時候，不同的病人對同一種藥物的治療會有不同程度的療效，有些藥物甚至在某些人會引起嚴重副作用，這些情況可能與基因有關，請你解釋為何基因會與上述情況有關。
3. 許多常見疾病都與基因有關，如：高血壓、癌症等。但這些常見疾病的遺傳模式很不明確，請解釋為何如此。

1.) Single choice Question: (60%)

Select the **one** that is best in each case and then completely fill in the corresponding space on the answer sheet. (3 point per choice)

- Virus-mediated transfer of cellular genetic material from one bacterial cell to another by means of virus particles is called: A) induction B) transfection C) transformation D) transposition E) transduction
- Which of the following processes leads to formation of polytene chromosomes? A) Nondisjunction of chromatids during meiosis B) Recombination between adjacent chromosome segments C) Sister chromatid exchange D) Inactivation of one chromosome of each homologous pair E) Repeated replication without separation of chromatids.
- In the classical model of transcriptional control described by Jacob and Monod, a repressor protein binds to A) an enhancer B) an AUG sequence C) an operator D) a ribosome-binding site E) a TATA box.
- The completion of the S phase of the cell cycle of a mammalian cell is marked by all of the following EXCEPT: A) Histone content per cell is double that of cells in G1. B) In replicated DNA, newly incorporated bases are paired with parental bases. C) Each replicated chromosome has four telomeres. D) Sister chromatids disjoin from one another. E) The nucleus contains the equivalent amount of DNA of a tetraploid cell in G1.
- All of the following contribute to promoter binding by RNA polymerase in *E. coli* EXCEPT the A) rho factor B) -10 consensus sequence C) -35 consensus sequence D) β' subunit of RNA polymerase E) β subunit of RNA polymerase.
- "Zinc fingers" are important in cellular regulation because they are A) at the catalytic site of many kinases B) a structure motif in many DNA-binding proteins C) characteristic of palindromic stretches of unique-sequence DNA D) restricted to cytoplasmic domain of growth-factor receptors E) structures with high redox potential.
- When the coding region of a prokaryotic gene is cloned into the *lac Z* gene downstream from the translational initiator, the chance of an in-frame fusion is A) $1/2$ B) $1/3$ C) $1/5$ D) $1/6$ E) $1/9$.
- DNA polymerase contains a lysine residue that is important for binding to DNA. Mutations were found that converted this lysine to either glutamate, glycine, valine, or arginine. Which mutations would be predicted to be the most and least harmful to the ability of the enzyme to bind DNA?

Most

Least

A) Valine

Aspartate

- B) Glycine Arginine
- C) Arginine Glycine
- D) Glutamate Valine
- E) Glutamate arginine

9. Which of the following is NOT a potential problem associated with expressing a eukaryotic, protein-coding nuclear gene in prokaryotic cells? A) Lack of an intron-splicing mechanism in prokaryotic cells B) Differences in the translation initiation codons used by eukaryotic cells and prokaryotic cells C) Susceptibility of the protein product to prokaryotic proteases D) Stability of mRNA in prokaryotic cells E) Differences in transcriptional signals between eukaryotic and prokaryotic cells.
10. The recognition site of the restriction endonuclease *Ava*I is CPyCGPuG, where Py is any pyrimidine and Pu is any purine. What is the expected average distance, in nucleotide pairs, between *Ava*I cleavage sites in a random DNA sequence? A) 4096 B) 1024 C) 682 D) 64 E) 6.
11. Two-dimensional (2-D) gel electrophoresis performed under denature conditions can be used to separate proteins according to which of the following characteristics?

First Dimension

Second Dimension

- | | |
|---|--------------------------|
| A) Subunit molecular weight | Density |
| B) Density | Charge |
| C) Amino acid composition | Charge |
| <input checked="" type="checkbox"/> D) Isoelectric point (PI) | Subunit molecular weight |
| E) Hydrophobicity | Subunit molecular weight |

12. Which of the following are found only in organisms containing polycistronic mRNA? A) Missense mutations B) Polar mutation C) Temperature-sensitive mutations D) Alternative splicing sites E) Deletio mutations.
13. The expression of the TRP operon in *E. coli* is regulated in part by the availability of the amino acid tryptophan. This regulatory process is referred to as A) attenuation B) translational read-through C) alternative splicing D) antitermination E) nonsense suppression.
14. Which of the following types of information CANNOT be determined from the traditional Northern blotting technique? A) The size of an mRNA species B) The half-life of an mRNA species C) The strand of DNA that is transcribed into mRNA D) The amino acid sequence of the protein coded by an mRNA species E) The relative levels of an mRNA species in different tissues.
15. An *E. coli* strain lacking DNA polymerase I would be deficient in DNA A) repair B) methylation C) translation D) degradation E) transcription.

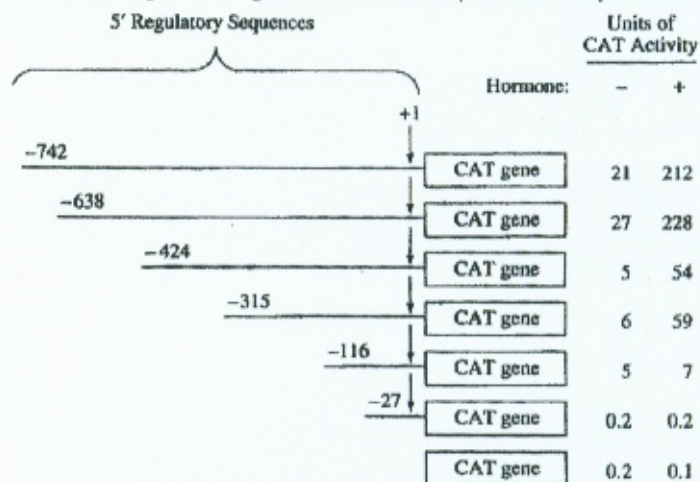
15. A trait determined by the action of more than one gene is called A) Polygenic B) Holandric C) polymorphic D) Epistatic E) pleiotropic.
16. Polymerase I of *E. coli* has two domains and three distinct enzymatic activities: DNA polymerase, 5'-3' exonuclease and 3'-5' exonuclease. Which statement is CORRECT in the following? A) The large domain (Klenow fragment) can be separated from the small domain by mild nuclease treatment. B) The large domain has the 3'-5' exonuclease and 5'-3' exonuclease activities, but not polymerase activity. C) The small domain has the DNA polymerase activity. D) The crystal structure of the large domain shows a very narrow cleft for binding DNA. E) The active site of the enzyme is remote from the 3'-5' exonuclease active site on the large domain.
17. Which statement is INCORRECT about translational regulation in eukaryotic mRNAs? A) Translational regulation may play an important role in regulating very long eukaryotic genes. B) Some proteins bind directly to 3'UTR of mRNA and act as translational repressors. C) Translational initiation factor eIF2 can be phosphorylated to activate translation. D) Binding proteins 4E-BPs are inactivated by protein phosphorylation. E) micro-RNAs are known to inhibit translation.
18. Restriction fragment length polymorphism (RFLP) CANNOT be used for A) detect gene expression in the tissue B) determine paternal-offspring relation C) determine victim-suspect relation in forensic medicine D) detect alternative splicing E) detect family genetic disease.
19. Eukaryotic translation differs from that of prokaryotes in several ways: A) The initiating codon frequently differs from AUG. B) There are many more releasing factors, a number of which dissociate into subunits that participate in control of the process. C) There are many more initiating factors, several of which dissociate into subunits. D) Prokaryotic translation requires an RNA cap binding factor. E) Eukaryotic translation requires GTP to charge the tRNAs instead of ATP.
20. Which of the following techniques CANNOT be used to detect tissue distribution of a gene? A) Southern Blot B) Western Blot C) RT-PCR D) Northern Blot E) In situ hybridization.

2.) Essay Question: (40%)

1. Please describe the processing of mRNA precursors in eukaryotic cells. (10 point)
2. Describe the types of post-translational modification in protein of eucaryotes,

and give one example to explain its importance. (10 point)

3. Researchers studying the regulation of a hormone-responsive gene isolated 742 base pairs of DNA immediately preceding the start site of transcription (+1). They demonstrated that if these sequences are cloned upstream of the bacterial chloramphenicol acetyltransferase (CAT) gene and the DNA then introduced into mammalian cells, CAT enzyme activity increase in response to hormone treatment. To define the sequences involved in regulation of this gene, they made a series of deletions containing various lengths of the 5' regulation sequences. They cloned these truncated DNA fragments upstream of the CAT gene as shown in the figure below, introduced the constructs into mammalian cells, and assays for CAT enzyme activity in the absent (-) and present (+) of hormone. The figure below gives the results of a representative experiment.



Please answer the following question:

- Assuming that there is a single hormone-responsive regulatory element in the gene, where is the element located?(5 point)
- What kind of transcriptional regulation information did you get from above exp.? (5 point)
- If you are the researcher, what kind of other else technique did you used to proof the above experiment result? Please describe its operate principle. (10 point)

1. 試述血液凝固的機制與瀰漫性血管內凝血異常 (disseminated intravascular coagulopathy) 之病理。(20%)
2. 試述細胞膜的構造與生理功能。(10%)
3. 試述鈣離子在細胞生理上所扮演的角色。(10%)
4. 試述幹細胞的定義與特性。(10%)
5. 試述腸麻痺 (Ileus) 的致病機轉。(10%)
6. 試述神經元突觸 (synapse) 的構造與作用機轉。(10%)
7. 試述癌細胞轉移的分子機制。(10%)
8. 試述慢性低氧狀態對呼吸系統的調控造成的影響。(10%)
9. 試述高血壓的致病機轉及運動對高血壓的影響。(10%)