

※選擇題請務必於答案卷上五題一列作答※

EXAMPLE: 1.() 2.() 3.() 4.() 5.()
6.() 7.() 8.() 9.() 10.()

I. Multiple Choice Question. 2 points for each question. 80 points.

PART A: Question 1 to 10 you should choose the answer closest to the meaning to the underlined word or phrase. One answer only.

1. China is suspected as the primary source of SARS that is spreading fast across the world.
(A) minor (B) primitive (C) first (D) intentional (E) targeted
2. The parents have lofty expectations for their son, so they sent him to the best high school.
(A) high (B) shaky (C) small (D) lowly (E) slight
3. Both sides in the election are trying to throw accusation at each other; the ruling party supporters claim that the opposing party is trying to thwart the will of people.
(A) evoke (B) help (C) figure out (D) tickle (E) block
4. Some people believe that lawyers are always working to see that justice is done. On the other hand, some believe that lawyers only want to manipulate the legal system to get what they want. Could both sides be right?
(A) control in a dishonest way (B) give help to (C) explain (D) disagree with (E) cheat on
5. Several companies are bringing out a couple of new models of laptops next year.
(A) changing (B) modifying (C) finishing (D) producing (E) benefiting
6. On the defensive about whether the war is unfolding as quickly and as smoothly as they had expected, the U.S. administration officials expressed confidence in the strength and flexibility of their military plan
(A) removing (B) developing (C) foretelling (D) expecting (E) providing
7. Although the hazards of space travel are many, the rewards made it a worthwhile endeavor.
(A) task (B) difficulty (C) effort (D) behaviors (E) incident
8. The renewed interest in single-sex schooling has fostered a controversy among educators.
(A) remembered (B) repeated (C) confident (D) brought back again (E) delayed
9. The congressman says he hopes the government takes a tough stand on the Cross-Strait issues.
(A) changes its position on (B) is optimistic about (C) makes a difficult choice about
(D) maintains a high standard on (E) is rude about
10. The workers stood in front of the ruined factory and wondered what to do next; they doubted that they would even collect their final pay checks now since the company was insolvent.
(A) changing a name (B) hiring new workers (C) prospering (D) laying people off (E) bankrupt

Part B. Question 11 to 20 you should choose the answer that best completes the sentence. One answer only.

Question 21 to 25 you should choose the best answer to fill each of the numbered blanks in the passage. One answer only.

11. In Hong Kong, most sumptuous bank headquarters _____ by a feng shui master who arranges the environment to make maximum use of "positive energy sources."
(A) have seemed designed (B) seem to have been designed (C) seem to design
(D) were seemingly designed (E) seem designed
12. To call the music of another music-culture "primitive" is one's own standards on a group _____ them.
(A) do not recognize (B) be not recognizing (C) that doesn't recognize (D) , doesn't recognize
(E) be recognized by them

13. Two hamburgers contain _____ the same number of chicken drumsticks.
 (A) more than fat as (B) more fat than (C) more fat as (D) as fat protein (E) fat as
14. Case studies are the target of much skepticism in the scientific community, _____ used extensively by numerous researchers.
 (A) they are (B) unless are (C) are (D) yet they (E) yet they are
15. _____ rain at all falls in the dry season in the Savanna regions of Africa.
 (A) Not (B) Without (C) No (D) Neither (E) Not having
16. A survey of public opinion—popularly called a poll—can provide us with a reasonably accurate measure of how people think, _____ certain conditions are met.
 (A) having (B) giving (C) seeing (D) had (E) provided
17. The higher the content of carbon dioxide in the air, _____.
 (A) more heat it retains (B) than it retains more heat (C) heat will be more retaining
 (D) it retains more heat (E) the more heat it retains
18. *Chicago*, _____, has given life to the musical, a genre many wrote off years ago
 (A) the movie (B) is the movie (C) which has a movie (D) movie it is (E) being movie
19. The purpose of a labor union is to improve the working condition, _____, and pay of its members.
 (A) jobs are secured (B) to be secure (C) the job's security (D) job security (E) having job security
20. Leslie Cheung _____ internationally for his role in "Farewell My Concubine," where he played a homosexual Chinese opera singer — a role which closely mirrored his life.
 (A) have know for the best (B) was best known (C) being best known (D) known (E) known best

_____ **21** _____ is to weep. The human species is the only one in the whole of animated nature that sheds tears. The trained inability of any human being to weep is a lessening of his capacity to be human—a defect which usually goes deeper than the mere inability to cry. _____ **22** _____ we feel like it, let us all have a good cry—and clear our minds of those cobwebs of confusion which have for so long _____ **23** _____ the ineluctable necessity of crying.

21. (A) To be human (B) Human (C) That human (D) Which human (E) Since the human
22. (A) In case (B) Despite (C) Unless (D) If (E) Otherwise
23. (A) prevented us to understand (B) prevented us from understanding (C) prevented understanding
 (D) been prevented us understanding (E) preventing us to understand

The World Health Organization, the Centers for Disease Control and Prevention, and the Hong Kong Health Department have all said masks are mainly of value for health care workers, to help prevent the spread of illness by people who feel sick and to protect _____ **24** _____ with those who feel ill. Advocates of wider mask use contend that people who are starting to feel unwell, and are thus perhaps _____ **25** _____, are more likely to wear masks if they are less likely to be stigmatized in a community where healthy people are wearing masks too.

24. (A) close contact (B) those have contact closely (C) having a contact (D) those in close contact
 (E) at close contact
25. (A) on the verge of infectiousness (B) with the infectious verge (C) in the infectiousness
 (D) infectious verge (E) having verge of infectiousness

PART C: Reading Comprehension. You will read several passages. Each one is followed by one question or a number of questions about it. Question 26-40, you should choose the ONE best answer to each question.

Did you know that the fats in our bodies, which we try so hard to get rid of through exercising and surgery, have a function? That the fat cells fight and never die? That exercising is better than dieting? That 70 percent of your calories are burned while you rest?

What is the main idea of the passage?

26. (A) Fat is increasingly harmful to your health as you age.
(B) There is more to fat than meets the eyes (pun sort of intended)
(C) Understanding in our bodies is important for good health.
(D) The more you rest, the faster your calories will be burned off.
(E) Exercising is as important as Dieting

We do not know how life began, but the fact that we exist proves that the right ingredients, in the right amounts, and arranged in the correct way, did come together at some time in the past. The best approximation is that it happened at least 2.5 to 3 billion years ago.

27. Which of the followings can best identify the topic?
(A) the past (B) time (C) the planet (D) evolution (E) origin of life

As a firefighter, I have seen many people die in hotel fires. Most could have saved themselves had they been prepared. There are over 10,000 hotel fires per year in the United States. In 1979, the latest year for which figures are available, there were 11,500 such fires, resulting in 140 deaths and 1,225 injuries."

28. What does the author use to introduce the essay?
(A) quotation (B) example (C) question (D) historical reference (E) facts and statistics.

In May 1960, the FDA approved the sale of a pill that arguably would have a greater impact on American culture than any other drug in the nation's history. For women across the country, the contraceptive pill was liberating: it allowed them to pursue careers, fueled the feminist and pro-choice movements and encouraged more open attitudes towards sex.

Among the key players in the development of the drug were two elderly female activists who demanded a contraceptive women could eat like aspirin and then paid for the scientific research; a devout Catholic gynecologist who believed a robust sex life made for a good marriage and argued tirelessly that the Pill was a natural form of birth control; and a brilliant biologist who bullied a pharmaceutical company into risking a possibly crippling boycott to develop this revolutionary contraceptive. In describing the obstacles they all hurdled, *The Pill* presents a compelling account of a society in transition.

29. The passage would most likely to be found in a textbook on which of the following subjects:
(A) Social Studies (B) History (C) Biology (D) Writing (E) Psychology

30. It can be inferred from the passage that _____.
(A) the sale of the contraceptive pill was a success
(B) the sale contraceptive pill had strengthened the feminist movement
(C) the contraceptive pill was the trigger of AIDS
(D) no other drug could be as successful as *The Pill*
(E) the sale of the Pill has started the fight between biologist and gynecologist

Someday we will all have robots that will be our personal servants. They will look and behave much like real humans. We will be able to talk to these mechanical helpers and they will be able to respond in kind. Amazingly, the robots of the future will be able to learn from experience. They will be smart, strong, and untiring workers whose only goal will be to make our lives easier.

31. Which sentence from the paragraph expresses the main idea?

- (A) Someday we will all have robots that will be our personal servants.
- (B) We will be able to talk to these mechanical helpers and they will be able to respond in kind.
- (C) They will look and behave much like real humans.
- (D) Amazingly, the robots of the future will be able to learn from experience
- (E) Robots will be smart, strong, and untiring workers.

As the conflict in Iraq deepens, so has the debate about television coverage. Secretary of Defense Donald H. Rumsfeld complained on Friday that "media mood swings" was distorting the depiction of American military strategy. Actually, the movement was less up and down than across the ideological spectrum. In the initial phase, the loudest complaints about bias were lodged by antiwar groups frustrated that television gave scant attention to their protests. As casualties mounted, so did conservatives' laments about a liberal bias at the networks.

32. It can be inferred from this passage that _____.

- (A) there are conflicts between antiwar groups and the authority
- (B) both antiwar groups and the government are unhappy about bias shown on TV
- (C) the TV coverage is defending the U.S. policies
- (D) People have debated a lot about the complete coverage of the war
- (E) the media is very objective

Diagnosing Alzheimer's disease (AD) has always been an inexact science. Now, there may be a new tool to add to the box. Researchers from the Medical College of Wisconsin used magnetic resonance imaging (MCI) to scan the brains of 24 people. By measuring activity in the hippocampus, the first place AD develops, they could determine which patient were normal, which had AD, and which had mild cognitive impairment (MCI), a major risk factor for AD. Until now, doctors have relied on the patient's symptoms to distinguish between patients with MCI and people with AD; the new test could provide objective information about just how close an MCI patient is to eventually developing AD.

The test is years from perfection and AD drugs are still in trial stages. But the possibility of early detection is now closer.

33. What might be a good title for this passage?

- (A) Alzheimer's Advance (B) Alzheimer's Cause (C) The Testing Process of Alzheimer
- (D) the test and AD drugs (E) the comparison between AD and MCI

34. The new test is served to be _____.

- (A) a perfect treatment for AD patients now
- (B) a pre-trial for a new drug
- (C) a research tool for collecting data for the better treatment for AD patients
- (D) detecting the relationship between the AD patients and the current drugs used for AD
- (E) a possible early detection about how a MCI patient would develop AD

The Snowy Owl is a bird of Arctic tundra or open grasslands and fields. They rarely venture into forested areas. During southward movements they appear along lakeshores, marine coastlines, marshes, and even roost on buildings in cities and towns. In the Arctic, they normally roost on pingaluks (rises in the tundra) and breed from low valley floors up to mountain slopes and plateaus over 1,000 meters (3,000 feet) in elevation. When wintering in the Arctic, they frequently wind-swept tundra with little snow or ice accumulation. At more southern latitudes they typically frequents agricultural areas

35. The passage is about the Snowy Owl's _____.

- (A) classification (B) hunting (C) breeding (D) habitat (E) distribution

Another noteworthy trend in twentieth-century in the United States has been the use of folk and popular music as a base for more serious composition. The motivation for these borrowings from traditional music might be a desire on the part of a composer to return to simpler forms, to enhance patriotic feelings, or to establish an immediate rapport with an audience. For whatever reason, composers such as Aaron Copland and Charles Ives offered compositions featuring novel musical forms flavored with refrains from traditional Americana. Copland drew upon folk music, particularly as sources for the music he wrote for the ballets Billy the Kid, Rodeo, and Appalachian Spring. Ives employed the whole gamut of patriotic songs, hymns, jazz, and popular.

36. The paragraph preceding this passage most probably discusses _____.

- (A) nineteenth-century music (B) one development in music in the last century
(C) the works of Aaron Copland (D) the history of folk and popular music

37. Which of the following best describes the main idea of the passage?

- (A) Traditional music flavored some American musical compositions in the twentieth century.
(B) Ives and Copland have used folk and popular music in their compositions.
(C) A variety of explanations exist as to why a composer might use traditional sources of music
(D) Traditional music is composed of various type of folk and popular music.

38. It can be inferred from this passage that the author is not sure _____.

- (A) when Ives wrote his compositions (B) that Ives and Copland actually borrowed from traditional music
(C) why certain composers borrowed from folk and popular music
(D) if Copland really featured new musical forms

39. Which of the following is NOT listed in the passage as a source for Ives's compositions?

- (A) National music (B) Religious music (C) Jazz (D) American novels

40. The passage would most probably be assigned reading in which of the following course?

- (A) American History (B) The History of Jazz (C) Modern American Music (D) Composition

II. Essay. Please write an essay in about 150 words. 20 points.

Topic: Some people dream of reaching unlikely goals, while other people set more reasonable and reachable goals. Which kind of person do you tend to be? Please give examples to support your statement.

1. Describe the hepatic portal system and the communication between hepatic portal and systemic veins. (12%)
2. Describe the venous drainage of head (includes the brain) and neck. (12%)
3. Describe the structure of spinal cord and the spinal meninges. (10%)
4. Describe the structure of duodenum, pancreas, liver, gallbladder, colon, peritoneum, and their relationship. (14%)
5. Describe and compare the male and female urogenital structures. (12%)
6. Describe the regional anatomy of neck. (10%)
7. Describe the following structures: (3 X 10 = 30%)
 - a. trigeminal nerve,
 - b. inguinal canal,
 - c. plantar arch,
 - d. trabecular carnae,
 - e. auditory ossicles,
 - f. pyramidal decussation,
 - g. paranasal sinus,
 - h. ductus thoracicus (thoracic duct)
 - i. hamstring muscles,
 - j. hip joint.

- 一. 試比較 lymph node, spleen, 和 thymus 之組織結構及功能. (20%)
- 二. 試描述身體各部位具 macrophage 功能之細胞 (10%)
- 三. 試描述 hyaline, elastic cartilages, and fibrocartilage 之組織結構及分布位置 (20%)
- 四. 試描述 skeletal, cardiac, and smooth muscles 之組織結構及分布位置 (20%)
- 五. 試描述 gastric, cardiac, and pyloric glands 之組織結構及分布位置 (20%)
- 六. 試描述 ovary 之組織結構 (10%)

Describe the following questions (10% per one question).

1. Give a drug as an example to explain how its pharmacological effects are mediated through the Ca^{2+} - phosphoinositide signaling pathway.
2. Describe the mechanism on vasodilation induced by acetylcholine through the muscarinic receptors.
3. Explain the pharmacological basis of captopril and losartan.
4. Ondansetron is a 5-HT₃ antagonist. Please describe the postreceptor mechanism after receptor binding and its clinical use.
5. Selegiline (deprenyl) is a drug used in the treatment of parkinsonism. Please describe the pharmacological basis of this effect.
6. Compare the pharmacological basis of the anti-inflammatory and side effects between indomethacin and rofecoxib.
7. Describe the mechanism on how steroid interacts with its receptors in the regulation of gene expression, and how Hsp90 plays the functional role in steroid signaling.
8. Zidovudine (azidothymidine, AZT) has been shown to decrease the rate of clinical disease progression and prolong survival in HIV-infected individuals. Please describe its pharmacological basis.
9. Recombinant human erythropoietin (rHuEpo, epoetin alfa) is now produced in a mammalian cell expression system by using recombinant DNA technology. However, where is the major organ to produce the endogenous erythropoietin? And also describe the pharmacological basis of its clinical use.
10. Describe the biological functions of GABA receptors, and list a representative drug for the ligand of GABA receptors.

問答題(請自下列六大題中任選五大題作答，每題二十分):

- ✓ 1. 請分別敘述肺臟及肝臟充血時所導致的病理變化?
- 2. 請分別敘述 scleroderma 及 Sjögren syndrome 的病理變化?
- ✓ 3. 試述化學致癌物質的致癌機轉(Mechanisms of chemical carcinogenesis)。
- ✓ 4. 試述下列腫瘤之病理變化:
 - A. adenoid cystic carcinoma
 - B. Kaposi sarcoma
 - C. schwannoma
 - D. seminoma
- ✓ 5. 試述 peptic ulcer 及 Hirschsprung disease 之病理變化。
- ✓ 6. 試述急性及慢性乙型病毒肝炎之病理變化。

- 一． 試舉例說明細胞膜的主動運送 (Active transport) 與促進擴散 (Facilitated diffusion) 。 (10%)
- 二． 試舉例說明生理上之正迴饋 (positive feedback) 及負迴饋 (negative feedback) 調節。並解釋這些迴饋調節的生理意義。 (20%)
- 三． 試說明 Antidiuretic Hormone (ADH) 的製造、分泌位置，生理功能，及其分泌所受的調控。 (20%)
- 四． 試說明 Excitation-Contraction Coupling 的過程。 (15%)
- 五． 試舉例說明接受體 (receptor) 的作用機轉以及其對生理反應的重要性。 (10%)
- 六． 試說明調控人體之胃酸分泌的作用機轉。 (10%)
- 七． 試以糖類再吸收 (glucose reabsorption) 為例說明腎小管的再吸收作用，其作用機轉，以及其生理意義。 (15%)

1. 寫出感染人體後在腸胃系統附著粘膜(mucosal attachment)及侵犯粘膜內(mucosal invasion)的線蟲類各 2 種，並說明其感染人體方式、感染後引起的病害。(20%)
2. 請說明肺吸蟲(*Paragonimus westermani*)的生活史及感染人體後所引起的病害。(10%)
3. 寫出感染人體後會引起自體感染(autoinfection)的條蟲，並說明其完整的生活史及如何鑑別診斷。(10%)
4. 寫出 5 種感染人體後會侵犯腦部的吸蟲類，並說明感染人體的方式，如何侵犯腦部及如何鑑別診斷？(15%)
5. 如何自糞便鑑別病患是感染十二指腸鉤蟲(*Ancylostoma duodenale*)、美洲鉤蟲(*Necator americanus*)或糞小桿線蟲(*Strongyloides stercoralis*)？(10%)
6. 寫出感染人體後侵犯粘膜(mucosal invasion)及上皮細胞(epithelial cell invasion)的原蟲類各 2 種，並說明其感染人體後引起的病害及診斷方式。(20%)
7. 寫出 5 種感染人體的條蟲，其節片(proglottids)會出現在糞便內，如何鑑別其特徵？(15%)

1. 細菌性及病毒性病原菌入侵人體後會刺激那些相同與相異之免疫反應來對抗這些外來物？(12.5%)
2. 解釋並簡述下列名辭：(15%)
 - a. Molecular mimicry
 - b. Antibody Dependent Enhancement (ADE)
 - c. Chemokine
 - d. Natural killer cell
 - e. Tumor Necrosis Factor α (TNF- α)
3. 試列舉五種檢驗病毒之臨床檢驗方法，並簡述其作用原理？(12.5%)
4. 敘述 Influenza virus A 於 1917-1918 年之大流行時，病人之病徵及疾病流行之過程。目前正流行之“SARS”與上述疾病之病徵及流行方式有何相似與相異之處？(12.5%)
5. 病毒若依核酸組成之不同分類可分為那幾類？每一類舉出一種病毒名稱。(12.5%)
6. 試舉出三種細菌性及二種病毒性病原菌會引起胃腸疾病 (Gastrointestinal disease)，並簡述這些病原菌之特性。(15%)
7. 敘述目前治療細菌性感染之可能方法與面臨之問題及解決之道。(10%)
8. 舉例敘述所有可能的方法治療病毒性病原菌之感染。(10%)

1. Insulin 對細胞能增加肝糖 (glycogen)合成，描述其訊息傳遞路徑。(10%)
2. 訊息傳遞通常是短暫(transient)。試述在 epinephrine 結合 7-transmembrane receptor 傳遞之訊息如何 feedback desensitization or inactivation。(10%)
3. 描述 glycolysis 途徑如何分解 glucose 形成 pyruvate，畫出結構及寫出名稱。(10%)
4. 描述偶數脂肪酸如何經由氧化產生能量。(10%)
5. 酵素之抑制劑之作用機制可分為 uncompetitive 或 competitive，利用 double reciprocal plot 解釋如何利用 kinetic parameter 區分此二作用機轉。(10%)
6. 試描述任意三種純化蛋白質(protein purification)之方法。(10%)
7. 當 clone 一個新的基因，欲研究其 encoded protein 之功能，通常須使用 expression system 去大量表現此一蛋白質。目前較常用的有 E. coli system，Pichia system，Baculovirus system，mammalian cell system，比較這些系統之優缺點。(10%)
8. Small interference RNA 為 2002 年生物醫學界重大技術突破，試描述此技術之原理及重要性。(10%)
9. 描述真核細胞(eucaryotic cell)之轉錄(transcription)，包含如何 open chromatin mechanism 及 transcriptional factors recruitment 之機轉。(10%)
10. 真核細胞蛋白質轉譯(translation)後必須送到各個不同位置，如 cell membrane，nucleus，endoplasmic reticulum 執行功能，這些蛋白質是如何被送到正確位置(protein sorting)，描述之。(10%)

1. 試述貧血之實驗室檢查(20%)
2. 試述出血性疾患之實驗室檢查(20%)
3. 試述甲狀腺機能低下之實驗室檢查(15%)
4. 試述臨床生化學檢查之血液檢體，其採取注意事項(15%)
5. 試述登革熱病毒(Dengue virus)感染之實驗室檢查(15%)
6. 試述炭疽桿菌(Bacillus anthracis)感染之實驗室檢查(15%)

簡答：(每題二十分)

1. Patterns of single gene inheritance
2. Name 10 common genetic diseases and its inheritance
3. Tools of human molecular genetics
4. (a) Genetic mapping and physical mapping
(b) Gene and pseudogene
5. Treatment of genetic diseases

1. 以超音波檢查淺部器官如眼及甲狀腺時,其所使用的頻率,下列何者最適宜?
 - 1) 0.5—1MHZ
 - 2) 1.5—2.5MHZ
 - 3) 3.5—4.5MHZ
 - 4) 5—10MHZ
2. 晚期胃癌指癌細胞已蔓延到胃壁肌層, Borrmann 氏分為下列那四型?
 - 1) 潰瘍型、凹陷型、低凹行及浸潤型
 - 2) 高凸型、息肉型、浸潤型及高起型
 - 3) 肉型、高凸型、潰瘍型及浸潤型
 - 4) 息肉型、潰瘍型、浸潤型及瀰漫浸潤型
3. 國內衛生最高單位(機構)對於 Magnetic resonance Imaging (MRI) 之正式中文名稱為:
 - 1) 核磁共振影像
 - 2) 核磁共振造影影像
 - 3) 磁振共振造影
 - 4) 磁振造影
4. 食道重複(Esophageal duplication), 呈圓型或卵圓型,常與食道平行之管狀構造位於下列何處?
 - 1) 後縱隔腔
 - 2) 前縱隔腔
 - 3) 頸部
 - 4) 腹部
5. 肥大性幽門狹窄(Hypertrophic pyloric stenosis) 之原因為:
 - 1) 幽門斜狀肌肥大
 - 2) 幽門直狀肌肥大
 - 3) 幽門環狀肌肥大
 - 4) 幽門黏膜肥大
6. Zenker's diverticulum (憩室) 只指憩室長在下列何處?
 - 1) 食道之中段
 - 2) 下咽後側之食道
 - 3) 喉部之前面
 - 4) 食道之下段
7. 能看清上眼眶裂(Superior orbital fissure), 應採用下列何位(view)攝影?
 - 1) Lateral view of skull
 - 2) Towne's view of skull.
 - 3) Caldwell's view of skull
 - 4) Law's view of skull
8. 一病童因行走不便及小便困難來診, 脊椎磁振造影發現腫瘤病灶表現為 T1 與 T2 影像均為高訊號者,其最可能診斷為?
 - 1) 神經纖維瘤
 - 2) 脊髓空洞症
 - 3) 脂肪瘤
 - 4) 脊髓炎
9. 小孩子要檢查骨骼生長年齡(bone age), 常要做何部位 X 光檢查?
 - 1) 頭部
 - 2) 腦下垂體窩
 - 3) 腕骨和掌骨
 - 4) 臀部
10. 大腸在身體最前面者為下列何部?
 - 1) 盲腸(cecum)
 - 2) 上升大腸
 - 3) 橫大腸
 - 4) 下降大腸
11. 正常食道與氣管的關係為:
 - 1) 食道在氣管的後方
 - 2) 食道在氣管的前方
 - 3) 食道在氣管的左方
 - 4) 食道在氣管的右方

12. 在乳房攝影中, 出現均勻的腺狀乳房組織時, 病患的年齡為:
- 1) 未有月經的少女
 - 2) 已開始有月經的青春少女
 - 3) 已有懷孕過的二、三十歲女性
 - 4) 停經後的女性
13. 下列中何種磁振造影中不會造成高訊號?
- 1) 進入現象 (entry phenomenon)
 - 2) 偶數回波重局相情形 (even echo rephrasing)
 - 3) 舒張期假對位情形 (diastolic pseudogating)
 - 4) 亂流 (turbulence)
14. 下列中何種磁振造影序列中脂肪變為沒有訊號 (黑色)?
- 1) T1-weighted
 - 2) T2-weighted
 - 3) STIR
 - 4) FLAIR
15. 正常大腦的氫磁振頻譜中除了水以外, 最高的峰 (peak) 通常是:
- 1) NAA (N-Acetylaspartate)
 - 2) creatine
 - 3) choline
 - 4) lactate
16. 迴轉速率 (slew rate) 是用以評估下列中何者?
- 1) 磁場 (magnet) 的均勻度
 - 2) 等階場 (gradient) 的功率
 - 3) 表面線圈 (surface coil) 的功率
 - 4) 電腦轉移資料快慢
17. 在 fast spin echo 或 turbo spin echo 中的 echo train 定義為:
- 1) 在每次 TR 中所收的 echo 次數
 - 2) 在每次 TE 中所收的 echo 次數
 - 3) 在每次 TI 中所收的 echo 次數
 - 4) 每次 echo 中所收的切片數
18. 下列磁振造影序列中何者 CSF 不為低訊號?
- 1) T1 影像
 - 2) 普通 IR 影像
 - 3) STIR 影像
 - 4) FLAIR 影像
19. 下列何者不為子宮輸卵管攝影的禁忌?
- 1) 懷孕
 - 2) 骨盆腔發炎
 - 3) 月經前或月經剛完
 - 4) 月經週期中間
20. 要檢查有否輸尿管逆流 (reflux) 時要作膀胱攝影, 其照相時間為:
- 1) 排小便前
 - 2) 排小便時
 - 3) 排小便後
 - 4) 注對比劑後三十分鐘
21. 病患疑有顳顎關節 (temporomandibular joint) 內錯亂 (internal derangement), 最佳檢查工具是:
- 1) 關節攝影
 - 2) CT
 - 3) 血管攝影
 - 4) MRI
22. 最準確早期偵測骨壞死 (osteonecrosis) 的方法為:
- 1) CT
 - 2) MRI
 - 3) SPECT
 - 4) EMG

23. 對下列何種患者的 IVU 檢查, 必須特別慎重評估其危險性?
- 1) 有鹿角狀結石至腎絞痛者
 - 2) 有血塊阻塞泌尿道者
 - 3) 超音波掃描已顯示腎盂積水者
 - 4) 尿量減少者
24. 在檢查下肢的深部靜脈血栓症 (deep venous thrombosis) 時, 用於顯影劑通常必須經由下列那一途徑給藥?
- 1) 腳部表淺靜脈 (superficial vein of foot)
 - 2) 腿部深部靜脈 (deep vein of leg)
 - 3) 膕靜脈 (popliteal vein)
 - 4) 股靜脈 (femoral vein)
25. 下列那種組織吸收最大幅射劑量?
- 1) 充血器官
 - 2) 肌肉
 - 3) 脂肪
 - 4) 骨骼
26. 醫療診斷用 X 光是屬於電磁幅射頻譜中的那一部分?
- 1) X 光不屬於電磁幅射
 - 2) 長波長部分
 - 3) 短波長部分
 - 4) 中波長部分
27. 眼眶最容易發生的骨折類型是:
- 1) 複合性骨折 (compound fracture)
 - 2) 爆裂性骨折 (blowout fracture)
 - 3) 線性骨折 (linear fracture)
 - 4) 陷入性骨折 (depression fracture)
28. 在未注射顯影劑的肝臟 CT 中就能見到清楚的門靜脈分枝陰影時, 通常表示肝臟發生下列何種狀況?
- 1) 浸潤性肝癌
 - 2) 門靜脈血栓症
 - 3) 脂肪肝
 - 4) 門靜脈內積氣
29. 下列對大腸 X 光檢查的描述何者錯誤?
- 1) 單對比檢查通常不必灌入空氣
 - 2) 闌尾沒顯現時並無法證實有闌尾炎
 - 3) 雙對比檢查才能顯示小息肉所在
 - 4) 腸套疊患者不應進行灌腸 X 光檢查以避免大腸破裂
30. "Acoustic shadow" 呈現於下列何種檢查的影像上?
- 1) MRI
 - 2) CT
 - 3) DSA
 - 4) Ultrasound
31. 在腦部的 "3 血管 (3-vessel)" 血管攝影中, 下列那個血管的攝影不是最常施行的檢查?
- 1) 右內頸動脈 (right internal carotid artery)
 - 2) 左內頸動脈 (left internal carotid artery)
 - 3) 右椎動脈 (right vertebral artery)
 - 4) 左椎動脈 (left vertebral artery)
32. 乳房超音波檢查, 最具診斷價值的是:
- 1) 鑑別良惡性腫瘤
 - 2) 鑑別囊狀及實質腫塊
 - 3) 偵測早期乳癌
 - 4) 偵測乳癌復發
33. 若 FFD (focal-film distance) 為 36 英吋時, 其輻射劑量為 400mR, 若其他條件不變, FFD 改為 72 英吋, 則其輻射劑量將是少 mR?
- 1) 100
 - 2) 200
 - 3) 800
 - 4) 1600

34. 脊柱的壓迫性骨折, 最常見於:
- 1) T₁₀, T₁₁
 - 2) T₁₂, L₁
 - 3) L₂, L₃
 - 4) L₄, L₅
35. 傑佛遜骨折(Jefferson fracture):
- 1) 第一頸椎之骨折
 - 2) 第二頸椎齒狀突之骨折
 - 3) 第七頸椎棘突之骨折
 - 4) 第二頸椎弓腳(pedicle)之骨折
36. 下列何者情況, 需做緊急腦血管攝影檢查?
- 1) 硬腦膜上血腫
 - 2) 硬腦膜下血腫
 - 3) 疑動脈瘤破裂, 造成的蜘蛛膜下腔出血
 - 4) 腦挫傷出血
37. 下列何者疾患, 在施行腦血管攝影時, 最需加長整個攝影時間(prolong filming time)?
- 1) 硬腦膜靜脈腔堵塞
 - 2) 先天性畸形
 - 3) 動脈瘤
 - 4) 動靜脈畸形
38. 正子射出性斷層造影(Brain PET imaging)的造影原理, 係正子(Positron)釋出後, 與電子互毀反應(Annihilation), 其產生兩個 511keV 光子的夾角為何?
- 1) 30 度
 - 2) 90 度
 - 3) 180 度
 - 4) 無一定角度
39. 下列為放出正子的放射性核種, 何者擁有最長的半衰期?
- 1) O-15
 - 2) N-13
 - 3) C-11
 - 4) F-18
40. 目前正子射出性斷層攝影機常用的偵檢器材質為:
- 1) CdTe
 - 2) BGO(Bismuth germanate)
 - 3) CsF
 - 4) GaAs
41. 下列哪一種製劑可用來偵測急性心肌梗塞, 也可用來作為骨骼造影?
- 1) Tc-99m PYP (Pyrophosphate)
 - 2) Tc-99m HSA (Human serum albumin)
 - 3) Tc-99m-MAA (Macroaggregated albumin)
 - 4) Tc-99m DMSA (Dimercaptosuccinic acid)
42. 放射線同位素肝臟造影中, 主要是由於下列何種細胞的作用而使肝臟顯影?
- 1) 多角細胞(Polygonal cell)
 - 2) 膽道細胞(Bile duct cell)
 - 3) 庫式細胞(Kupffer cell)
 - 4) 白血球細胞(White blood cell)
43. 肺臟灌注造影檢查所注入之巨聚合顆粒(Macroaggregated particles), 最後經由何種途徑離開人體?
- 1) 肝及脾臟移除
 - 2) 顆粒球之吞噬作用
 - 3) 腎臟排除
 - 4) 無法排除
44. 99mTc-MDP 靜脈注射後, 經由何處排出體外?
- 1) 腎臟
 - 2) 肺臟
 - 3) 大腸
 - 4) 完全由身體吸收

45. 下列的哪一種檢查是口服放射性藥品的檢查？
- 1) I-131 的 Thyroid uptake counting
 - 2) Xe-133 的 Lung scan
 - 3) Tc-99m 的 Thyroid Scan
 - 4) I-131-RISA 的 CSF flow determination
46. 人類在 30 天內死亡一半個體數的輻射致死劑量 ($LD_{50/30}$) 約為多少 Gy？
- 1) 2.5~3.0。
 - 2) 4.0~5.0。
 - 3) 6.0~7.0。
 - 4) 8.0~9.0。
47. 平行對稱照野中，皮膚表面劑量以何種能量最低？
- 1) Co-60
 - 2) 4MV x-ray
 - 3) 10 MV x-ray
 - 4) 6 MV x-ray
48. 臨床放射線治療劑量投予之限制主要受限於何種組織？
- 1) 正常組織。
 - 2) 腫瘤組織。
 - 3) 淋巴組織。
 - 4) 循環組織。
49. 高能電子射束的表面劑量隨能量增加而增加的原因是：
- 1) 穿透力降低。
 - 2) 散射增加。
 - 3) 散射降低。
 - 4) X 光污染增加。
50. 下列何種物質(相同厚度)橫置於射束路徑上，對表面劑量的增加率最低？
- 1) 鋁板。
 - 2) 銅板。
 - 3) 錫板。
 - 4) 鉛板。

Q&A(60%)

1. What is the central dogma of molecular biology?
2. (a) Describe the meanings of three underlines shown in the below table.
(b) Rationale your answer and show how to calculate the genome size from the polymerization rate in this *E. coli* polymerase III.

DNA polymerases

Characteristic	Polymerase		
	I	II	III
Molecular weight	103,000	88,000	900,000
Polypeptide subunits	1	4	10
Polymerization rate (nucleotides/sec)	16 - 20	7	<u>250-1000</u>
Activity			
<u>3' -> 5' exonuclease</u>	Yes	Yes	Yes
<u>5' -> 3' exonuclease</u>	Yes	No	No

3. What is RM system (restriction and modification)? Describe the historical event of the RM system and its evolutionary interactions between T4 phage and their hosts.
4. Describe and explain the processing of eukaryotic mRNA.
5. Describe the regulation mechanism of Trp operon.
6. Describe the principles of recombinant DNA

Compare the items as followings: (40%)

1. Nucleoside and nucleotide
2. Type I Topoisomerase and Type II Topoisomerase
3. Genome and proteome
4. Nucleotide excision repair and base excision repair
5. RT-PCR and real-time PCR
6. RNAi and antisense RNA
7. Wobble hypothesis and degeneracy
8. leucine-zipper and zinc-finger proteins.
9. Ubiquitin and SUMO
10. Yeast Two-hybrid system and Phage display

1. 試述心肌細胞接受電刺激後引起收縮之分子機制
2. 試述正常肝臟功能，並說明嚴重肝病病人感染後易導致敗血症的原因
3. 試述控制短期食慾及長期體重之各種影響因子。Leptin 及 neuropeptide Y 之角色為何？
4. 試述脂肪的代謝及血漿中 lipid 的運送，並說明 high cholesterol 易導致 atherosclerosis 之機制
5. 試述重組 DNA (recombinant DNA)及基因選殖(cloning of DNA)在生物學、醫學或遺傳學的應用
6. 以生長激素為例說明 Hypothalamic-pituitary-end-organ axis 的回饋控制機制。
並敘述 GH 促進生長之直接與間接作用
7. 為何 DNA double helix 上 AT-rich 的區域(如 TATA box)適合當作 transcription 的 recognition site?
8. 以 thalassemia 為例說明 gene mutation 後蛋白質合成缺損導致疾病之過程
9. 試述分裂性細胞在細胞週期(cell cycle)中各個 phase 所執行的工作
10. 請寫出自己興趣的主題中懸而未決的的疑問，並嘗試設計一個實驗來印證或考驗自己的假設。

1. 試以服務對象、處理問題、診斷依據與解決流程比較臨床醫學與預防醫學的差異？(16%)
2. 試由一般性預防和特殊性預防說明傳染病防治的工作內容？以及說明醫院傳染的防制原則為何？(12%)
3. 試以我國空氣污染防制法界定的內容說明空氣污染物之種類？(16%)
4. 試說明下列公共衛生常用的衛生指標？(24%)
 - A. 死因別死亡率
 - B. 新生兒死亡率
 - C. 發生密度
 - D. 周產期死亡率
 - E. 二次侵襲率
 - F. 致死率
 - G. 當代平均餘命
 - H. 年齡標準化發生率
5. 試述醫療成本控制的方法？(14%)
6. 假如近10年來，A地區肺結核的盛行率顯著上升，而B地區的肺結核盛行率則顯著下降。試問此二地區肺結核盛行率之差異的可能解釋原因為何？若此二地區在10年前均有一健康照護計畫的介入，則這些介入對肺結核盛行率的作用為何？(18%)