I. Multiple Choice Questions: Choose only one correct answer to each question　60%

Part A. Vocabulary　20%

_____1.Taiwan today is a _____ democracy with a highly competitive market-oriented economy.
(A) hulking (B) humpy (C) hurly-burly (D) hole-and-corner

_____2. CD sales have been declining year-on-year with the introduction of CD _____ and MP3 files.
(A) burners (B) collectors (C) composers (D) lovers

_____3. We're always in search of _____ in technology development.
(A) trespass (B) straightness (C) crackdown (D) breakthroughs

_____4. Although youthful, vigorous and prosperous, the Taiwanese have become victims of an education system that seeks to produce _____ earners rather than original thinkers.
(A) wholesome (B) high-wage (C) weary (D) high-handed

_____5. John's _____ is bothering him because he lied to his colleagues.
(A) consensus (B) conscience (C) consciousness (D) consentience

_____6. Mary is very _____. She says exactly what she's thinking even if it hurts.
(A) questionable (B) befuddled (C) bashful (D) blunt

_____7. This gourmet restaurant has a most _____ group of patrons, including Catholics, Moslems, Buddhists and Hindus.
(A) elated (B) elective (C) eclectic (D) elastic

_____8. Investors have become more _____ after the recent stock market crash.
(A) circumspect (B) circumfluent (C) circumjacent (D) circumpolar

_____9. In Chinese, there is no _____ at the end of a word to indicate the plural form.
(A) inflection (B) infliction (C) inflation (D) infraction

_____10. The _____ growth in the number of users of the Internet is the most amazing phenomenon in mass communication in recent years.
(A) explorative (B) exponential (C) expiatory (D) explicable

Part B. Grammar　20%

_____11. The music is becoming more diverse that young people _____ complete freedom to access and exchange information.
(A) having (B) being (C) were (D) have had

_____12. Without direct access to information and resources in WHO (World Health

(背面有試題)

Organization), Taiwan _____ to fight diseases on its own.
(A) has had (B) had being (C) has been (D) was

_____13. Tina is so candid that when I'm listening to her, I feel _____ she is my trust friend.
(A) even if (B) as if (C) what if (D) that if

_____14. Nowadays, the television _____ as a babysitter, with nannies particularly.
(A) was used (B) has using (C) is being used (D) is been used

_____15. Susan _____ stupid all in her life.
(A) has been being (B) is been (C) has being (D) was been

_____16. The agency sent us several applicants, the most qualified _____ was the first one.
(A) that (B) whose (C) in whom (D) of whom

_____17. It has been suggested that each member _____ some money for the renovation of the clubhouse.
(A) contributes (B) has contributed (C) contribute (D) has been contributed

_____18. It _____ by many that she had married for money.
(A) is thinking (B) thinks (C) was thought (D) thought

_____19. I haven't gone to that exhibit yet, nor do I have any intention _____.
(A) x (B) to (C) in (D) of

_____20. _____ every effort is being made to improve the financial condition of this company, the term of the loan will be extended.
(A) As much as (B) As well as (C) Since that (D) Inasmuch as

Part C. Cloze Test 20%

The talented Tom Hanks has played many different movie roles. Terminal is the first movie ___21___ he must speak with a European accent. He plays Viktor, a traveler ___22___ small country is destroyed by war when he takes a plane to America. Viktor cannot return home, ___23___ can he enter the U.S. Then he falls in love with a pretty flight attendant and ___24___ plan an escape!

_____21. (A) in which (B) where (C) that (D) which

_____22. (A) that (B) whom (C) who (D) whose

_____23. (A) nor (B) or (C) seldom (D) even

_____24. (A) is (B) have (C) must (D) ought

The roommate situation is the first challenge students face. Learning to tolerate a stranger's idiosyncrasies ___25___ teach flexibility and the art ___26___ compromise. But the learning process is often painful.

_____25. (A) ought (B) may (C) like (D) as
_____26. (A) in (B) at (C) of (D) on

Campus officials say that communicating on the Internet or roaming the huge universe of information ___27___ the World Wide Web holds an especially powerful lure for many college students ___28___ it takes them ___29___ a vast new realm of learning and research, usually ___30___ no cost.

_____27. (A) on (B) in (C) at (D) of
_____28. (A) which (B) whose (C) what (D) because
_____29. (A) for (B) into (C) of (D) at
_____30. (A) of (B) on (C) at (D) in

II. Reading Comprehension: Choose the best one answer to each question 20%

Learning is an active, constructive process whereby the learner strategically manages the available cognitive resources to create new knowledge by extracting information from the environment and integrating it with information already stored in memory. With the rapid development of computer technology and its application in language instruction, many researchers in the past ten years have engaged in the study of this kind of active and constructive learning process in multimedia environment. Researchers have found that a multimedia learning environment provides the means to facilitate the learning process by manipulating the availability of specific information at a given moment, by controlling the duration of that availability, by varying the way information is presented, and by ensuring the ease with which it can be searched.

_____31. What is the main idea of the passage?
(A) Multimedia learning environment organizes the information for learners.
(B) Multimedia learning environment differs from computer technology.
(C) Multimedia learning environment provides the availability in the learning process.
(D) Multimedia learning environment controls the duration of learning.

_____32. Which one of the followings can identify the topic?
(A) Researchers have pointed out the rapid development of learning.
(B) Multimedia environment facilitates the learning process.
(C) The learner extracts information and stores in memory.
(D) Learning is an active and constructive process.

Complimenting is a kind of speech act belonging to the category of expressives.

Complimenting is a positive politeness strategy aiming to praise the addressees for a past or present action. In other words, compliments are prime examples of speech acts that notice and attend to the hearer's interests, wants, and needs. A frequent denotation is Holmes's (1988:446) definition: "A compliment is a polite speech act which explicitly or implicitly attributes credit to someone other than the speaker. Usually, the person addresses for something good which is positively valued by the speaker and hearer." She defines a compliment as a speech act that is accomplished either explicitly or implicitly to express admiration or approval for some good of the addressee. In such a situation, explicit compliments are those whose meaning is understood literally, as in a direct speech act. Similarly, implicit compliments account for indirect speech acts whose meaning can be inferred among participants.

_____33. Which one of the followings expresses the topic of this passage?

(A) The various categories of expressives
(B) The direct and indirect speech acts
(C) The positive politeness strategy of the speakers
(D) The definition and classification of compliments

_____34. Which one of the followings is not correct?

(A) Compliments notice the hearer's interests and needs.
(B) A compliment expresses admiration for something good of the addressee.
(C) A compliment is a polite speech which is valued by the speaker.
(D) Implicit compliments are those whose meaning is understood literally.

Traditionally, sculpture as a genre has not been as powerful of a creative phenomenon in Pacific-rim cultures like China, Japan or Korea. But it has thrived in cultures of the Aegean, like the Cycladic islands and later the mainland of Greece centering on Athens where stone sculpture reached its apogee early, attaining ease and fluidity in the round, as well as becoming a palpable conveyor of motion and emotions. To this day, Europeans walking the streets, let alone going into cathedrals or museums, are profoundly familiar with images of solid forms moving in space.

_____35. The passage is about _____.

(A) Aegean　(B) space　(C) sculpture　(D) genre

After I had been living in Singapore for 18 months, my return to the U.K. was depressing when it came to fish dinners. Having enjoyed my sojourn in Southeast Asia and discovered Asian wet-market culture with the wonderful selection of live seafood and fresh fish including blue-fin tuna, wild sea bass, and coral grouper, going home was a shock. Of course, in the U.K. we have superb cold-water fish such as

halibut, cod, and haddock, but when you buy seafood you'll find yourself gazing in disbelief at the prices and at the sorry-looking half-frozen display of defrosting specimens that an Asian chef would reject immediately.

_____36. Which one of the followings is not listed in the passage?
(A) geographic region (B) restaurants (C) delicious dishes
(D) markets

_____37. What might be a good title for this passage?
(A) Prices of Fish (B) Defrosting Specimens (C) Southeast Asia
(D) Wet-market Culture

If you are a frequent patron of fast-food restaurant in Taipei, you may have discovered that most stores have added some new dishes to their menus. For the first time since it set up shops in Taiwan 19 years ago, KFC has introduced a pork burger. McDonald has also added a pork burger to its offerings, and Japanese-owned Mos Burger has started to serve a shrimp burger and seafood meals.

All of the changes were adopted to make up for declining sales of chicken and beef following the spread of avian influenza across 10 countries in Asia since mad cow disease discovered on December 23, 2003 in Washington State in the United States. Although the bird flu has appeared in Taiwan located as the weaker strain this year, the government's Council of Agriculture reports that at least affected 371,000 chickens and ducks had been put to death in the end of February. With regard to the mad cow disease, the government stipulated that any beef containers packaged after December 24, 2003 would not be allowed to enter Taiwan.

_____38. Which one of the followings is not correct?
(A) The avian flu and mad cow disease have caused consumers to promote seafood.
(B) The bird flu has appeared in Taiwan located as the weaker strain.
(C) The government stipulated a ban on beef imports.
(D) Fast-food restaurants set up in Taiwan nineteen years ago.

_____39. The main idea of this passage is that _____
(A) fast-food restaurants have added new dishes for consumers.
(B) the spread of avian influenza comes across ten countries in Asia.
(C) the owners of the fast-food restaurants acknowledge the great impact on the diseases.
(D) mad cow disease has been discovered in Washington State in the United States.

_____40. It can be inferred from this passage that _____
(A) fast-food restaurant owners welcome beef imports from mad-cow-

（背面有試題）

disease-free countries.

(B) fast-food restaurants have to revise their menus or sources of supply.

(C) the wave of international epidemics has triggered considerable anxiety among government workers.

(D) the sales of chicken and beef have been changed to well-cooked rice.

III. Writing an Essay　20%

Topic: Art is engendered in the genuine creativity and inspiring originality. Some say that genius is liberated only when the artist remains deaf to outside noises, deeply fascinated by, and more than satisfied with, the ever-expanding horizons within. What are your viewpoints and expectations about genius?

1. Describe the arterial blood supply and venous drainage of the abdominal visceral organs. (12%)
2. Describe the structure of meninges and its relationship with central nervous system. (10%)
3. Describe the regional characteristics of the spinal cord. (10%)
4. Describe the structure of heart and its blood supply. (12%)
5. Describe the muscles of anterior abdominal wall and inguinal region. (10%)
6. Describe the superficial structures and contents of anterior triangle of neck. (10%)
7. Describe the following: (3 x12= 36%)
   a. caput medusae
   b. knee-jerk stretch reflex
   c. recurrent laryngeal nerve
   d. vasa recta
   e. hepatoduodenal ligament
   f. transverse pericardial sinus
   g. paranasal sinus
   h. splanchnic nerves
   i. iliotibial tract
   j. basilar artery
   k. ligamentum teres of liver
   l. deltopectoral triangle

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高雄醫學大學九十三學年度碩士班招生考試　　組織學試題　第 1 頁

I. 解釋名詞（不是翻譯；需簡述或說明）；每題 2 分。

1. endocrine gland
2. endothelium
3. transitional epithelium
4. transcytosis
5. basement membrane
6. desmosome
7. apocrine secretion
8. mixed seromucous gland
9. periosteum
10. leukocytes
11. perimysium
12. intercalated disk
13. Nissl's bodies
14. pseudo-unipolar neuron
15. sheath of Schwann
16. mesangial cells
17. Hassall's corpuscles
18. hepatic portal triad
19. discontinuous capillaries
20. pneumocyte type II
21. Leydig cells
22. neurohypophysis
23. external root sheath
24. zona pellucida
25. parietal cells

II. 問答題（任選 5 題作答；請以文字說明，句子需完整；如繪簡圖更好）；每題 10 分。

1. 比較 gray matter 與 white matter 組織構造之差異。
2. 何謂 diffuse lymphatic tissue？
3. 何謂 portal system 並舉 2 種例子說明。
4. 比較 olfactory epithelium 與 respiratory epithelium 細胞種類與排列之差異。
5. 說明 adrenal cortex 其組織構造（細胞排列與種類）。
6. 說明 epidermis 其組織構造（細胞排列與種類）。

問答題(請自下列六大題中任選五大題作答，每題二十分)

(1) 試敘述血栓形成的因素及血栓的種類。

(2) 請分別敘述:

a. 脂肪變性(fatty degeneration)

b. 透明變性(hyaline degeneration)

(3) 請舉例說明:

a. 化膿性發炎(suppurative inflammation)

b. 僞膜性發炎(pseudomembranous inflammation)

(4) 試敘述副腫瘤症候群(paraneoplastic syndrome)。

(5) 試敘述痲瘋桿菌(mycobacterium leprae)感染的病理變化。

(6) 試比較病理組織切片(histologic slide)與細胞抹片(cytologic smear)在常規製作上的差異性。請自檢體採集至染色完畢作比較。

1. 試述細胞凋亡(Apoptosis)的特性，並說明其生理上的重要性 (10%)

2. 試述葡萄糖自腎小管管腔穿越腎小管上皮細胞進入血流的運送方式 (10%)

3. 試述腦血管障壁(Blood-brain barrier)的構造及其生理與臨床意義 (10%)

4. 試述循環性休克(circulatory shock)的可能原因、機制與症狀 (10%)

5. 試述粒線體(mitochondria)的構造、功能及其與細胞命運之關聯 (10%)

6. 是以生殖系統為例說明 positive feedback 及 negative feedback (10%)

7. 試述動脈粥狀硬化(Atherosclerosis)發展過程及抗氧化劑可能的療效 (10%)

8. 試述骨重塑(bone remodeling)的調控及骨質疏鬆(osteoporosis)的常見原因 (10%)

9. 試舉例說明印證 A 事件與 B 事件有"因果關係"的方法 (10%)

10. 試以您興趣的主題說明為何想報考生理及分子醫學研究所 (10%)

1. 在台灣人體嗜伊紅性腦膜炎(eosinophilic meningitis)最主要是感染何種寄生蟲所引起？說明其生活史，在人體引起的病害及診斷的方法。(20%)
2. 說明人體感染惡性瘧(*Plasmodium falciparum*)引起的病害，引起各項病害的機轉及如何鑑別診斷。(20%)
3. 舉出四種淡水魚媒介的吸蟲，以其中一種爲例說明其生活史，並各說明此四種吸蟲引起人體的病害。(20%)
4. 舉出 4 種成蟲長度小於 1 公尺，寄生於人體腸道的條蟲，說明其生活史、所引起的病害及如何鑑別診斷。(20%)
5. 寫出下述寄生蟲感染人體的中間宿主、具感染人體能力的發育階段及侵犯人體的主要部位。

寄生蟲種類	中間宿主	發育階段	寄生部位
例：*Ascaris lumbricoides*	不需中間宿主	胎蟲卵	小腸
例：*Anisakis* spp	海水魚	第三期幼蟲	胃及十二指腸
1. *Strongyloides stercoralis*			
2. *Onchocerca volvulus*			
3. *Trypanosoma cruzi*			
4. *Diphyllobothrium latum*			
5. *Giardia lamblia*			

1. 請說明補體,白血球及抗體於急性發炎反應中之關係與角色? (12%)
2. CTL(毒殺性 T 細胞)與 NK 細胞(自然殺手細胞)於感染細胞之毒殺作用中有何不同? (10%)
3. 何謂內毒素?對人體所造成的影響爲何? (10%)
4. 請說明幽門螺旋桿菌之特性及與疾病之關性以及臨床如何診斷此病原菌感染? (12%)
5. 請列出引起細菌性腦膜炎最重要之三種病原菌? (12%)
6. 得過破傷風疾病後是否具有終生免疫效果?請說明原因? (8%)
7. 請說明造成臨床細菌快速產生抗藥性之可能原因? (8%)
8. 何謂狂牛症?人的感染情形爲何? (10%)
9. 造成禽流感之致病原爲何?經歷幾次之全球流行恐慌後, 請說明爲何以現代醫療科技仍無法完全根除? (10%)
10. 解釋並簡述下列 (8%)

    (a) episome, Hfr (b) transposon

I. 選擇題 (單選, 每題 2 分, 共 70 分, 請於答案卷上作答)

1. Which of the following statements regarding peptide bond is incorrect?
(A) The peptide bond is a planar structure
(B) The –CN- bond has a partial double-bond character which makes rotation about the bond axis
(C) Small peptides are common and often have important biological roles
(D) *Linus Pauling* is the first scientist in discovry of regular polypeptde structure

2. Amino acids found in collagen that are formed by post-translational modification of two of the common amino acids including which of the following?
(A) Arg, Lys
(B) Pro, Lys
(C) Thr, Pro
(D) Pro, Tyr

3. Which of the following statements regarding peptide hydrolysis by proteolytic enzymes or chemical reagent is incorrect?
(A) Trypsin with specific cutting sites on C-terminal of basic amino acids
(B) Chymotrypsin with specific cutting sites on C-terminal of some non-polar amino acids
(C) CNBr with specific cutting site on Cys
(D) Bacteria cell wall containing d-form amino aicd may avoid from proteolytic hydrolysis

4. Regarding a serial steps of purification for identifying protein function, which of the following methods are properly applied in order? 1. determine purity 2. fractionate the crude extract 3. affinity chromatography 4. develop an assay to identify and quantify the desired protein
(A) 1 2 3 4
(B) 2 3 4 1
(C) 3 4 1 2
(D) 4 2 3 1

5. Which of the following statements concerning protein structure and function is incorrect?
(A) A given domain type can sometimes be recognized in several differently proteins.
(B) Multiple domains are common in the larger globular proteins.
(C) Herpesvirus is composed of icosahedral symmetry structure under electron micrographic observation
(D) "Domain" is a compact, locally folded region of secondary structure of protein.

(背面有試題)

6. Amino acids considered nonessential for humans are:
(A) those not incorporated into protein.
(B) not necessary in the diet if sufficient amounts of precursors are present.
(C) the same for adults as for children.
(D) the ones made in specific proteins by post-translational modifications.
(E) generally not provided by the ordinary diet.

7. Pyruvate and alanine are components of a shuttle that involves:
(A) hepatic and renal gluconeogenesis.
(B) hepatic gluconeogenesis and transport of muscle nitrogen to liver as alanine.
(C) transport of alanine to muscle to supply pyruvate.
(D) the production of alanine for use in protein synthesis in most peripheral tissues.
(E) transport of alanine between cytosol and mitochondria of liver.

8. Which of the following essential dietary factors is a precursor for a compound that can act as a carrier of one-carbon fragments at different levels of oxidation?
(A) Methionine
(B) Thiamine
(C) Folic acid
(D) Biotin
(E) Pyridoxine

9. Which of the followings is not used in biosynthesis of purine?
(A) Glutamate
(B) CO2
(C) Aspartate
(D) Glycine

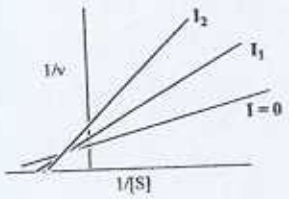
10. The biologic effects of phorbol estes may be traced to their effects on
(A) Adenylate cyclase
(B) Protein kinase A
(C) Protein kinase C
(D) Phospholipase C

11. A single base change in an mRNA may result in:
(A) No observable mutation
(B) A missense mutation
(C) A nonsense mutation
(D) All of the above
(E) None of the above

12. In what condition, enzyme can reach the maximum rate
(A) [S] << Km
(B) [S] = Km
(C) all the enzyme is bound with the substrate
(D) temperature reachs to 100°C.

13. What is the functional role of the oxyanion hole in serine protease catalyzed reaction?
(A) general base catalysis
(B) metal ion binding
(C) proximity and orientation
(D) transition state stability

14. The steady-state kinetic pattern of enzyme with substrate (S) in the varied concentration of inhibitor (I) was shown in the following figures. The concentration of inhibitor $I_2 > I_1 > I_0$. What kind of inhibiton is it?
(A) competitive inhibition
(B) noncompetitive inhibition
(C) uncompetitive inhibition
(D) irreversible inhibition



15. L. Pauling suggested that enzymes should have a much higher affinity for the transition state than for the ground state (reactant). It indicates the enzyme catalyzed reaction through
(A) lower the reactant free energy
(B) lower the energy barrier of a reaction
(C) lower the equilibrium constant
(D) lower the entropy.

16. Fumarase catalyzes the conversion of fumarate to malate and is described as a proficient enzyme or perfect enzyme. In what condition, an enzyme can be called a perfect enzyme.
(A) The reaction is diffusion-limited.
(B) It is an enzyme-substrate complex.
(C) An enzyme has a K_M less than 1 μM.
(D) k_{cat} is a rate-limiting step.

17. An inhibitor which covalently binds with enzyme is classified as
(A) competitive inhibitor
(B) noncompetitive inhibitor
(C) uncompetitive inhibitor
(D) irreversible inhibitors.

（背面有試題）

18. In the hepatic metabolism of ethanol, which one of the following is false?
(A) β-oxidation of fatty acid is increased
(B) the NADH / NAD^+ ratio is increased
(C) hepatic oxidation of lactate is inhibited
(D) gluconeogenesis is impaired

19. Which of the following cannot take place in the human body?
(A) transformation of acetoacetate into glucose
(B) transformation of glycerol into glucose
(C) transformation of alanine into pyruvate
(D) transformation of acetate into glucose
(E) tranasformation of glucose to fatty acid

20. Which of the following fatty acids would yield gluconeogenic precursors ?
(A) palmitic acid (C16:0)
(B) hepadecanoic acid (C17:0)
(C) linolic acid (C18:2)
(D) arachidonic acid (C20:5)

21. The role of the citrate in fatty acid biosynthesis and glucose metabolism is :
(A) to act as a precursor for addition of carbon
(B) to activate fatty acid synthetase
(C) to activate acetyl-CoA carboxylase
(D) to activate phosphofructokinase-1
(E) to activate pyruvate dehydrogenase

22. All of the following are true of the TCA cycle except which one?
(A) It begins with the condensation of acetyl-CoA and oxaloacetate
(B) The cycle is involved in both catabolic and anabolic pathways
(C) The cycle directly requires molecular oxygen in one of its enzymatic reaction
(D) GTP is produced by a substrate-level phosphorylation in the cycle
(E) The cycle participates in the synthesis of glucose from pyruvate

23. During the first week of diet of 1500 calories per day, the oxidation of glucose via glycolysis in the liver of a normal 59-kg (130-lb) woman is inhibited. What is the major mechanism for inhibition of glycolysis in liver during gluconeogenesis?
(A) glucokinase is inhibited by the high concentration of glucose-6-phosphate
(B) Phosphorylation of phosphofructokinase-2/fructose-2,6-bisphosphatase leads to decreased levels of fructose-2,6-bisphosphate,which is an allosteric activator of phosphofructokinase-1
(C) Increased hepatic acetyl-CoA inhibits the activity of pyruvate dehydrogenase
(D) Hydrolysis of glucose-6-phosphate to glucose decreases the availability of glucose-6-phosphate for glycolysis

24. After a well-rounded breakfast, which of the following would be expected to occur?
(A) increased activity of phosphorylase kinase
(B) increased activity of phosphoenolpyruvate carboxykinase
(C) decreased rate of glycogenesis
(D) increased activity of pyruvate dehydrogenase
(E) decreased activity of acetyl CoA carboxylase
(F) increased activity of pyruvate carboxylase

25. Which of the following metabolites is involved in glycogenolysis, glycolysis, and gluconeogenesis
(A) galactose-1-phosphate
(B) glucose-6-phosphate
(C) UDP-glucose
(D) fructose-6-phosphate
(E) glucose-1-phosphate

26. The key regulatory enzyme of the pentose phosphate pathway is positively regulated by
(A) reduced nicotinamide dinucleotide (NADH)
(B) adenosine diphosphate (ADP)
(C) guanosine triphosphate (GTP)
(D) nicotinamide dinucleotide phosphate ($NADP^+$)
(E) reduced flavine adenine dinucleotide (FADH)

27. A child has ingested cyanide from her parents' garage and is rushed to the emergency room. Which of the following components of the citric acid cycle will be depleted first in the child?
(A) NAD^+
(B) oxaloacetate
(C) succinate CoA
(D) citrate

28. A comatose laboratory technician is rushed into the emergency room. She dies while you examining her. Her most dramatic symptom is that her body is literally hot to your touch, indicating an extremely high fever. You learn that her lab has been working on metabolic inhibitors and that there is a high likelihood that she accidentally ingested one. Which one of the following is the most likely culprit?
(A) oligomycin
(B) dinitrophenol
(C) barbiturate
(D) cyanide
(E) antimycin D

(背面有試題)

29. As electrons are received and passed down the transport chain show below, the various carriers are first reduced with acceptance of the electron and then oxidized with loss the electron. A patient poisoned by which of the following compounds has the most highly reduced state of most of the respiratory chain carriers?
(A) antimycin A
(B) rotenone
(C) puromycin
(D) carbon monoxide
(E) chloramphenicol

30. Which of the following correctly describes the intermediate 4-hydroxy-3-methylglutaryl CoA?
(A) It is formed by HMG CoA reductase
(B) It is an intermediate in the synthesis of 3-hydroxybutyrate and acetoacetate
(C) It is formed only in cytosol
(D) It is formed by condensation of two molecules of acetyl CoA
(E) It inhibits the first step in cholesterol synthesis

31. What protein often malfunctions in diseases associated with the symptoms of high blood triacylglycerides levels and steatorrhea?
(A) LDL receptor
(B) Lecithin:cholesterol acyltransferase (LCAT)
(C) phospholipase C
(D) lipoprotein lipase
(E) pancreatic lipase

32. Which one of the following tissues can metabolize glucose, fatty acids, and ketone bodies for ATP production?
(A) adiposes tissue
(B) liver
(C) muscle
(D) brain
(E) red blood cells

33. It has been noted that infants placed on extremely low-fat diets for a variety of reasons often develop skin problems and other symptoms. This is most often due to
(A) deficiency of fatty acid desaturase greater than $\triangle^9$ ($\triangle^{12}$,$\triangle^{15}$)
(B) deficiency of chylomicron and VLDL production
(C) overproduction of prostaglandin E_2
(D) glycogen storage disease
(E) sphingolipidose

34. Which one of the following compounds is a key intermediate in the synthesis of both triacylglycerols and phospholipids?
(A) Phosphatidate
(B) CDP-choline
(C) eicosanoid
(D) CDP-diacylglycerol
(E) Ceramide

35. A teenager girl suffers from hypoglycemia. Inherited defect in all of the following enzymes may be the cause of hypoglycemia except which one?
(A) glucose-6-phosphatase
(B) debranching enzyme
(C) muscle phosphorylase
(D) carnitine acyltransferase I
(E) long-chain 3-hydroxylacyl-CoA dehydrogenase

II. Match proteins in column B with the functions in column A (10 分)
（請於答案卷上作答）

Column A	Column B
1. Remove RNA primer from the Okazaki fragments and copies DNA	A) Topoisimerase
2. Eukaryotic mRNA capping	B) DNA polymerase I
3. Regulates the SOS response in E.Coli	C) DNA polymerase III
4. Joins Okazaki fragments and other disconnected pieces of DNA together	D) DNA ligase
5. Catalyzes supercoiling isomerization	E) Primase
6. Control the lytic pathway in bacteriophage λ	F) Helicase
7. Polymerizes dNTPs	G) Telomerase
8. Uses ATP to unwind double-strand DNA	H) Guanyl transferase
9. Synthesis of RNA primer	I) Lex A
10. Maintenance of the length of chromosomes	J) Cro protein

III. Please explain the following terms or techniques (20 分) (請於答案卷上作答)

1. Reporter gene
2. RFLP
3. Kozak consensus sequence
4. Splicesome
5. Ubiquitin
6. Signal sequence
7. FISH
8. Proliferating cell nuclear antigen
9. Northern blotting
10. Leucine zipper motif

1. 試述 SARS 之實驗室診斷(15%)
2. 試述結核桿菌之實驗室診斷(15%)
3. 試述急性白血球症(acute leukemia)之 cytochemistry, immunophenotyping 實驗室診斷(15%)
4. 試述影響生化檢驗正常值之變數(15%)
5. 試述分子生物學在檢驗之臨床應用(15%)
6. 試述 lipid, lipoprotein 及其實驗室測定(10%)
7. 試述臨床檢驗之品質管制(15%)

每題 20 分

1. Explain gene structure and the genetic contributions to medicine.
2. Compare with acquired and constitutional chromosome anomalies.
3. Brief overview the tools of molecular genetics.
4. Describe mitochondrial DNA.
5. Explain program of genetic and metabolic newborn screening in Taiwan.

1. 比較並說明 Osmosis、Osmolarity、Osmolality 及 Tonicity 之異同及相關性；並舉例說明在生理學之運用。(10%)
2. 以電氣生理學之觀點比較說明 Skeletal muscle、Smooth muscle 及 Cardiac muscle 收縮及舒張機制之異同及意義。(10%)
3. 測定血糖之方法及參與血糖控制之 Hormones 有那些？並說明其作用機制及相關性。(10%)
4. 以 Reflex arc 之架構談人體神經系統之功能。(10%)
5. 以生理學之觀點談 Liver and Biliary system。(10%)

生物化學試題 (50%)

簡答題(註：作答時專有名詞以英文書寫)

一、寫出兩種含鹼性胺基酸。(2%)
二、Ketone bodies 由那些組成。(3%)
三、寫出人體內兩種重要的六碳醣。(2%)
四、寫出三種跟能量代謝有關的 Coenzyme。(3%)

問答題

一、寫出 Electron transfer chain，並說明 CO、CN 中毒時的抑制位置，及如何解毒？(10%)
二、人體內有那些抗氧化酵素及抗氧化物質，與癌病變的發生有何相關性？(10%)
三、說明 Vitamin D 的形成過程及主要生理作用，洗腎的病人對 Vitamin D 需求及影響如何？(10%)
四、嚴重急性呼吸道症候群(SARS)由病毒引起，可造成人類重大傷亡，我們如以生物技術方法(如基因工程)尋找出診斷防治及抗 SARS 物質的方法。(10%)

1. Fibonacci relation is a second-order homogeneous recurrence relation in which f_n is defined as the following:

$$f_0 = 0, \quad f_1 = 1, \quad f_n = f_{n-1} + f_{n-2} \quad \text{for } n \geq 2$$

(a) Write a recurrent program (or pseudo code) to generate f_n for a given n. (10%)

(b) Solve the Fibonacci relation for f_n (10%)

2.

(a) Use basic logic gates (i.e., AND, OR, and inverter) to draw the Boolean expression $x_1x_3 + x_2'$ (5%)

(b) Rewrite the above network with NAND elements only. (5%)

(c) Find the minimal sum-of-products form for the following Boolean expression

$x_1x_2'x_4 + x_1x_3'x_4 + x_2'x_3'$ (10%)

3.

(a) Please explain what "race condition" is? (5%)

(b) One solution to solve race condition is the use of semaphore in an operation system. What is a semaphore? Describe its P, V operations? (10%)

(c) A binary semaphore is a semaphore whose integer can range only between 0 and 1. Show how a general semaphore can be implemented using binary semaphores? (10%)

4.

(a) Please explain what a "deadlock" is? When a deadlock happens, the system must recover from the deadlock. Please give at least two ways for breaking a deadlock? (5%)

(b) What is the main difference between starvation and deadlock? Can a system detect that some of its processes are starving? If the answer is yes, explain how, if the answer is no, how the system can deal with starvation problem? (5%)

(c) Design an algorithm for crossing the river such that deadlock and starvation are not possible. (5%)

5.

(a) Construct a transition system recognizer for the regular expression 10*110*1 (5%)

(b) A machine M is described by the following state table. Draw the state graph for

machine M. What output corresponds an input sequence of 11010? (5%)

Present State	Next State		Output
	Present Input		
	0	1	
s_0	s_3	s_1	1
s_1	s_4	s_1	0
s_2	s_3	s_0	1
s_3	s_2	s_3	0
s_4	s_1	s_0	1

(c) Find the equivalent-state partitions for the above machine M and construct the corresponding reduced machine. (10%)

1.

(1) Suppose that an array A[-1:3,2:4,1:4,-2:1] is to be arranged in row-major order, beginning in the memory location 200, and each element of A[i, j] requires 5 units of storage. Identify the first memory location used for each of the following array elements.
(a) A[3, 4, 4, 1]; (b) A[3, 2, 1, 0]; (c) A[0, 2, 2, 0]; (d) A[1, 3, 3, 1] (10%)

(2) A double ended queue (deque) is a linear list in which additions and deletions may be made at either end. Write algorithms to add elements from either end of the deque. (10%)

2.

(1) Obtain the adjacency matrix and adjacency list of the graph of Figue1. (4%)

(2) Write a minimal spanning tree algorithm (e.g., Kruskal's or Prim's) and use it to illustrate (step by step) how the minimal spanning tree of the graph in Figure 1 can be obtained? Also give the cost of the tree you derive. (10%)

(3) Design a DFS (Depth First Search)-based and a BFS (Breadth First Search)-based algorithms to determine the minimal spanning tree of the graph in Figure 1. (10%)

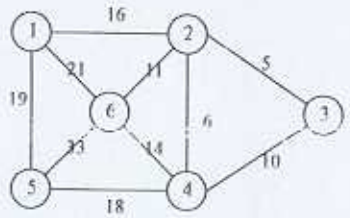


Figure 1

3.

(1) What are the average time and worst time to sort n objects using the following algorithms? (a) bubble sort; (b) quick sort; (c) heap sort; (d) merge sort (8%)

(2) Quicksort is an unstable sorting method. Use quicksort to determine the order of the records with keys 36, 21, 15, 38, 52, 15, 6, 48, and explain why this sorting method is unstable. (12 %)

(3) Show how heapsort works for sorting the following numbers (in increasing order): 5, 4, 1, 8, 3, 2, 7. (10%)

(4) What kind of data structure you would use for the heap in the heapsort program? Explain why. (6%)

4.

(a) Suppose the node structure of a binary tree is (Llink, Data, Rlink) in which L-child and R-child are links pointing to the left and right sub-trees of a node respectively. Write an algorithm to determine whether two binary tree T1 and T2 are identical. (10%)

(b) Map the expression A / B * * C * D + E into a binary tree, and then find the prefix and postfix forms of this expression by the pre-order and post-order tree traversals. (10%)

1. 比較並說明 Osmosis、Osmolarity、Osmolality 及 Tonicity 之異同及相關性；並舉例說明在生理學之運用。(10%)
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