

國立中興大學 113 學年度

學士後醫學系公費生招生考試

普通生物及生化概論試題

考試時間：100 分鐘

考試開始鈴響前，不得翻閱試題，且不得書寫、畫記、作答！
本考試不得使用計算機

考生請注意：

- 一、考生應確實關閉行動電話(或取出電池)及手錶之鬧鈴設定；除准考證及考試必需用品外，所有物品(含行動電話、穿戴式裝置等)均應立即放置於臨時置物區，不得發出聲響或有影響試場秩序之情形。
- 二、請確認抽屜中、桌椅下、座位旁均無其他非必要用品。如有任何問題請立即舉手反映。
- 三、坐定後，雙手離開桌面，請核對並確認准考證、座位標籤、答案卡及答案卷上之准考證號碼是否完全相同。如有錯誤，應立即舉手請監試人員處理。
- 四、考生應試時不得飲食、飲水、抽菸、嚼食口香糖。
- 五、答案卷限用黑色或藍色筆。答案卡劃記以 2B 鉛筆為佳，劃記時要粗黑、清晰，劃滿作答格，不可出格，不得折損答案卡，修正作答以軟性橡皮擦擦拭乾淨，且不得使用修正液(帶)修正，未遵照正確作答方式而致機器無法正確辨識答案者，考生自行負責，不得以任何理由補救。答案寫在試題紙上者不予計分。
- 六、本試題必須與答案卡及答案卷一併繳回，不得攜出試場。

本試題共三部分，共 150 分。

第一部分與第二部分請於答案卡上作答。第三部分請於答案紙上作答，在試題紙上作答不計分。

第一部分：單選題；1 - 22 題，每題 3 分；23-48 題，每題 2 分，共 118 分。(不倒扣)。

第二部分：多重選擇題；49 - 61 題，每題 2 分，共 26 分。試題每個選項答對得 0.5 分，答錯倒扣 0.5 分，該題不作答該題得 0 分，第二部分多重選擇題倒扣，最少以 0 分計算。

第三部分：問答題，3 題；每題 2 分，共 6 分。(不倒扣)

第一部分：單選題

1. Vioxx and other prescription nonsteroidal anti-inflammatory drugs (NSAIDs) are potent inhibitors of the cyclooxygenase-2 (COX-2) enzyme. The inhibitory efficacy of these drugs is decreased in the presence of high substrate concentrations. These drugs are

- (A) allosteric regulators.
- (B) prosthetic groups.
- (C) feedback inhibitors.
- (D) competitive inhibitors.
- (E) noncompetitive inhibitors.

2. Three cells with distinct volumes and surface areas are listed in the following table:

	Volume	Surface Area
Cell 1	18.5 μm^3	41.6 μm^2
Cell 2	13.1 μm^3	38.2 μm^2
Cell 3	10.2 μm^3	27.3 μm^2

Based on data from the table above, which of the following statements “best” explains which cell will eliminate wastes most inefficiently?

- (A) Cell 1 because it has the lowest ratio of surface area to volume, which will enable it to eliminate its wastes most inefficiently.
- (B) Cell 2 because it has the highest ratio of surface area to volume, which will enable it to eliminate its wastes most inefficiently.
- (C) Cell 3 because it has the smallest volume, which will enable it to eliminate its wastes most inefficiently.
- (D) Cell 3 because it has the smallest surface area, which will enable it to eliminate its wastes most inefficiently.

3. Of the following events, which best describes the steps in a signal transduction pathway?

a) Tyrosine kinase receptor subunits dimerize; b) An enzyme cascade occurs, increasing the number of activated proteins; c) A reconfigured protein binds to DNA, altering gene expression; d) A signal molecule is bound by a transmembrane tyrosine kinase receptor protein; e) The receptor protein complex phosphorylates other proteins.

- (A) adbce
- (B) adecb
- (C) daebc
- (D) deabc
- (E) aedcb

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4. It has been reported that long-term hormone replacement therapy (HRT) in women with menopause may increase the risk of cancer, possibly because
- (A) Hormone opens channels in the membrane for other substances to enter
 - (B) Hormone receptor opens channels in the nuclear envelope for cytoplasmic molecules to enter
 - (C) Hormone enables water-soluble molecules to diffuse across membranes
 - (D) Hormone-receptor complex regulates gene transcription in the nucleus
 - (E) Hormone-receptor complex transfers the phosphate groups from ATP
5. Individuals with the inherited disease familial hypercholesterolemia have a very high level of cholesterol in the blood because the cholesterol can't be transported by
- (A) pinocytosis
 - (B) receptor-mediated endocytosis
 - (C) exocytosis
 - (D) phagocytosis
 - (E) facilitated diffusion
6. The drug cytochalasin B binds to the barbed end of actin. Which of the following events of the cell cycle in animal cells would be most likely disrupted by cytochalasin B?
- (A) spindle formation
 - (B) spindle attachment to kinetochores
 - (C) separation of sister chromatids
 - (D) movement of chromosomes to the poles during anaphase
 - (E) cleavage furrow formation and cytokinesis
7. Which of the following statements describes one characteristic of each chromosome in a cell during the entire process of meiosis I?
- (A) Each chromosome is joined with its homologous pair to form a synaptonemal complex.
 - (B) Each chromosome is paired with a homologous chromosome.
 - (C) Each chromosome consists of two sister chromatids joined by a centromere.
 - (D) Each chromosome consists of a single strand of DNA.
 - (E) Sister chromatids cross over.
8. The sheep Dolly was cloned by which of the following processes?
- (A) isolation of stem cells from a lamb embryo and production of a zygote equivalent
 - (B) transfer of an adult cell's nucleus into an enucleated sheep egg, followed by incubation in a surrogate
 - (C) separation of an early-stage sheep blastula into separate cells, one of which was incubated in a surrogate sheep
 - (D) replication and dedifferentiation of adult stem cells from sheep bone marrow
 - (E) the nucleus of an embryonic cell was used to replace the nucleus of an adult cell, which was incubated in a surrogate sheep
9. The insulin gene is transcriptionally expressed in certain pancreatic cells, but not in skin cells. Which statement best explains this?
- (A) Pancreas cells express an activator protein that binds the insulin enhancer.
 - (B) Pancreas cells have more enhancers in the insulin gene.
 - (C) The insulin genes in pancreatic cells and skin cells have different promoters and, therefore, they respond to different regulatory proteins.
 - (D) Skin cells lack an enhancer in the insulin gene.
 - (E) Skin cells lack the insulin gene.

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10. What is the correct sequence in which the following occur during a primary humoral immune response?
1. helper T cell activation; 2. B cell activation; 3. plasma cell differentiation and proliferation; 4. antibody secretion; 5. presentation of antigen on class II MHC proteins
(A) 5, 2, 1, 4, 3
(B) 4, 5, 2, 1, 3
(C) 4, 5, 3, 1, 2
(D) 5, 2, 1, 3, 4
(E) 5, 1, 2, 3, 4
11. When the admissions committee asks you questions, you hear, understand, and then reply to them. To accomplish this process, what is the correct order of the areas of the cerebral cortex that were used?
1. auditory association area
2. Wernicke's area
3. premotor area
4. primary motor area
5. primary auditory area
6. Broca's area
(A) 5, 1, 6, 2, 3, 4
(B) 1, 5, 2, 6, 3, 4
(C) 5, 1, 2, 6, 3, 4
(D) 1, 5, 6, 2, 3, 4
(E) 5, 1, 2, 6, 4, 3
12. Which molecule is correctly paired with its function?
(A) glucocorticoids—decrease blood glucose
(B) nitric oxide—increases blood flow into the penis
(C) parathyroid hormone—lowers blood calcium
(D) aldosterone—increases sodium excretion by kidneys
(E) norepinephrine—reduces heart rate
13. Which of the following accurately characterizes evolution?
(A) Evolution involves organisms evolving towards greater complexity.
(B) Genetic changes occur in populations across generations.
(C) Genetic drift favors the most abundant traits.
(D) Individuals adapt to environmental changes over time.
14. Which observation about a population would NOT violate the assumptions of the Hardy-Weinberg principle?
(A) UV radiation induces new mutations.
(B) Individuals have migration.
(C) Inbreeding is present.
(D) Population size is very big.
15. Which of the following describes a similarity between fungi and arthropods?
(A) The haploid state is dominant in both groups.
(B) Both groups are predominantly autotrophs that produce their own food.
(C) Both groups use chitin for support.
(D) Both groups have cell walls.

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16. Moss, liverwort, and hornwort cannot grow as tall individuals because
- (A) they don't have chlorophyll.
 - (B) they don't develop vascular bundles to deliver water.
 - (C) the efficiency of photosynthesis is slow.
 - (D) their life cycle cannot make them taller.
17. What's the fundamental idea of the biological species concept proposed by Ernst Mayr?
- (A) homology isolation
 - (B) disruptive isolation
 - (C) convergent isolation
 - (D) reproductive isolation
18. Which structure/cell in angiosperm is diploid ($2n$)?
- (A) endosperms
 - (B) pollen
 - (C) megasporocyte
 - (D) egg
19. Which of the following is an example of Batesian mimicry?
- (A) a nonvenomous larva of a moth that moves like a venomous snake
 - (B) a butterfly that resembles a leaf
 - (C) a deer with fur colouring that camouflages it in the forest environment
 - (D) a turtle that uses its tongue to mimic a worm, thus attracting fish
20. Which of the following biomes is characterized by low temperatures, high winds and a lack of trees?
- (A) tundra
 - (B) savanna
 - (C) grassland
 - (D) chaparral
21. When a predator approaches the bird's nest, the bird's parents pretend to get hurt, make noise to draw attention to the predator and expose themselves to increase predation risk to protect their offspring. Such altruistic behavior is best explained by the phenomenon of
- (A) selfish genes
 - (B) group selection
 - (C) individual selection
 - (D) kin selection
22. What are some potential consequences of eutrophication?
- (A) increased fish population
 - (B) loss of oxygen in water bodies
 - (C) reduction in nutrient levels
 - (D) improvement in water clarity
23. A virus consisting of a single strand of RNA, which is reverse transcribed into complementary DNA, is referred to as a _____.
- (A) protease
 - (B) retrovirus
 - (C) bacteriophage
 - (D) non-enveloped virus

24. What is NOT one of the key characteristics of animals that make them become efficient consumers?
- (A) heterotrophs
 - (B) flagellated gametes
 - (C) nerve and muscle cells
 - (D) digestive system
25. Which of the following is a role of specific transcription factors?
- (A) Unwind the DNA helix
 - (B) Form pre-initiation complexes
 - (C) Bind to response elements
 - (D) Recruit DNA polymerase
26. How can cells with the same genes come into being unambiguously dissimilar cell types with specialized functions? By selective
- (A) Post-translational modification
 - (B) Transcription
 - (C) DNA replication
 - (D) Translation
27. All of the following groups, when added to histones, can result in an enhanced transcription EXCEPT
- (A) Phosphate
 - (B) Acetyl
 - (C) Phenyl
 - (D) Methyl
28. What does the binding of a probe to the membrane in a Northern blot indicate
- (A) The desired DNA sequence is present in the sample
 - (B) The desired RNA sequence is present in the sample
 - (C) The desired protein is present in the sample
 - (D) The desired amino acid sequence is present in the sample
29. What governs the sequence by which tRNAs convey amino acids to mRNA
- (A) The attractiveness between an mRNA codon and an amino acid on tRNA
 - (B) The attractiveness between an mRNA codon and a tRNA anticodon
 - (C) The attractiveness between an mRNA anticodon and a tRNA codon
 - (D) The attractiveness between an mRNA anticodon and an amino acid on tRNA
30. Producing 100,000 different proteins from 20,000 genes delineates
- (A) Alternative splicing
 - (B) DNA repair
 - (C) Post-translation modification
 - (D) Elongation
31. What is the molecular event by which the operator of an operon regulates the expression of its structural gene(s)?
- (A) The operator codes for the repressor, which binds to the structural genes
 - (B) The operator codes for the repressor, which binds to the RNA polymerase
 - (C) The operator is bound by the repressor, thereby inhibiting RNA polymerase
 - (D) The operator is bound by the regulator gene, thereby inhibiting RNA polymerase

32. What is the best statement regarding protein folding?
- (A) Protein folding increases the entropy of the system, thus it follows the 2nd law of thermodynamics
 - (B) Protein folding decreases the entropy of the system, thus it follows the 2nd law of thermodynamics
 - (C) Protein folding increases the entropy of the system, thus it violates the 2nd law of thermodynamics
 - (D) Protein folding decreases the entropy of the system, thus it violates the 2nd law of thermodynamics
33. A 10-year-old girl is brought by her parents to the dermatologist. She has many freckles on her face, neck, arms, and hands, and the parents report that she is unusually sensitive to sunlight. Two basal cell carcinomas are identified on her face. Based on the clinical picture, which of the following processes is most likely to be defective in this patient?
- (A) Removal of pyrimidine dimers from DNA by nucleotide excision repair
 - (B) Removal of mismatched bases from the 3'-end of Okazaki fragments by a methyl-directed process
 - (C) Repair of double-strand breaks by error-prone homologous recombination
 - (D) Removal of uracil from DNA by base excision repair
34. During RNA synthesis, the DNA template sequence TAGC would be transcribed to produce which of the following sequences?
- (A) ATCG
 - (B) CGTA
 - (C) AUCG
 - (D) GCUA
35. Methylation and subsequent deamination of cytosine produces what type of mutation after one round of DNA replication?
- (A) C-to-T transversion
 - (B) C-to-T transition
 - (C) G-to-A transition
 - (D) C-to-A transversion
36. As a measure of quality control in translation, which component of the translation machinery is capable of proofreading and editing amino acids?
- (A) the ribosome
 - (B) Aminoacyl-tRNA synthetases
 - (C) tRNAs
 - (D) RNA polymerase
37. The hydrogen bonding interactions in a Watson-Crick AT base-pair involve what units in the adenine base?
- (A) N-1 and the amino group on C-6
 - (B) N-1 and N-3
 - (C) N-7 and the amino group on C-6
 - (D) N-7 and C-8
38. Splice sites in pre-mRNA are marked by two universally conserved sequences contained
- (A) in the middle of the intron.
 - (B) at the ends of the exons.
 - (C) at the ends of the introns.
 - (D) None of the above

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39. An isolate of a mutant bacterium appears to grow more slowly than the wild-type population from which it was isolated. Further studies showed that the slower growth was due to a markedly reduced DNA polymerase I activity. From this information, one would expect that this organism would also be deficient in the activity of DNA
- (A) excision repair.
 - (B) recombination.
 - (C) transcription.
 - (D) translation.
40. Which of the following molecules can be considered a final product in the flow of genetic information within a cell?
- (A) DNA
 - (B) RNA
 - (C) Protein
 - (D) Protein or RNA can be the final product of a gene.
41. Which of the following is not a reason for the importance of mRNA processing in eukaryotes?
- (A) Longevity in the cytoplasm
 - (B) Coupling of transcription and translation
 - (C) Turnover in the cytoplasm
 - (D) Removal of introns
42. Of the following steps associated with translation, which does not involve hydrolysis of GTP?
- (A) Aminoacylation of tRNA
 - (B) Formation of the initiation complex
 - (C) Binding of the aminoacyl tRNA to the codon at the A site
 - (D) Translocation of the ribosome
43. In eukaryotes, the 3' end of the mRNA is important in the initiation of translation because
- (A) it contains Kozak sequences that aid in initiation.
 - (B) translation occurs in the 3' to 5' direction.
 - (C) eIF4A is attached to the 3' end and removes any secondary structure that might prevent translation.
 - (D) the 3' poly(A) tail and PABP bind initiation factor eIF4G, stabilizing the 5' end of the mRNA.
44. Which of the following statements is not true concerning peptidyl transferase?
- (A) It is a ribozyme having catalytic activity.
 - (B) It catalyzes peptide bond formation.
 - (C) It moves the ribosome, so translation continues.
 - (D) It is associated with the large subunit of ribosomes.
45. Gene knockdown via RNAi relies on the ability of eukaryotic cells to
- (A) degrade target mRNAs that are complementary to introduced dsRNA.
 - (B) induce microRNA expression under particular conditions.
 - (C) preferentially degrade mutated mRNAs.
 - (D) inhibit transcription of sets of genes based on the presence of distal control elements.

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46. You are working with a gene associated with an essential pathway that is necessary at two time points in an organism's lifetime. With regard to gene regulation, you would expect the gene to be
- constitutive.
 - associated with response to distinct events through induction and repression signals.
 - induced by particular signals.
 - repressed by particular signals.
47. The amount of a protein in a cell is regulated by the rate of
- transcription of its gene.
 - translation of its mRNA.
 - degradation of the protein.
 - All of the above
48. Release of RNA polymerase II to initiate transcription appears to be the direct result of the
- binding of TAFs to the polymerase.
 - unwinding of the DNA by helicases.
 - phosphorylation of RNA polymerase by a protein kinase.
 - removal of the nucleosome occupying the promoter site.

第二部分：多重選擇題；49 - 61 題，每題 2 分。

試題每個選項答對得 0.5 分，答錯倒扣 0.5 分，該題不作答該題得 0 分，第二部分多重選擇題倒扣，最少以 0 分計算。

49. What are some diseases caused by vitamin deficiencies that affect the pyruvate dehydrogenase complex and α -ketoglutarate dehydrogenase complex?
- vit. B1 – cheilosis, angular stomatitis
 - niacin – pellagra
 - pantothenic acid – fatigue, insomnia, depression, irritability
 - riboflavin – Wernicke-Korsakoff syndrome, beriberi
50. In the case of a patient with liver cirrhosis who also indulges in alcohol consumption, which of the following physiological states might be observed? Which of the following statements could be correct?
- The first step in alcohol metabolism requires pyruvate decarboxylase, and patients may benefit from additional thiamine supplementation.
 - The thiazole ring of TPP serves as the functional moiety of the coenzyme, facilitating the binding and transfer of active aldehyde. These steps do not require ATP.
 - Alcohol dehydrogenase is present in animal tissues, even though ethanol is not a primary metabolic product in animal cells.
 - Acetaldehyde and its metabolite do not pose toxicity to animals.
51. Which of the following statements about diseases associated with mitochondrial gene mutations and affected electron transport chain complexes are incorrect?
- Leigh Syndrome causes difficulty swallowing and decreased motor abilities → only complex I and IV
 - Hypertrophic cardiomyopathy results in cardiac enlargement and degeneration → only complex III and IV
 - Pearson Syndrome leads to sideroblastic anemia → only complex I and IV
 - Kearns-Sayre syndrome causes ophthalmoplegia and ragged red fibers → only complex I and IV

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52. Among the following carbohydrates, glucose transport proteins, and specific tissue cell functions, which statement is/are incorrect?
- (A) GLUT1 – galactose – kidney cells and intestinal epithelial cells
 - (B) GLUT2 – fructose – intestinal and renal tubular basolateral epithelial cells, liver cells
 - (C) GLUT4 – glucose – brain, placenta, testes
 - (D) GLUT7 – fructose – membrane of endoplasmic reticulum in liver cells
53. In the movie "Extraordinary Measures," Harrison Ford portrays a character who admires Dr. Chen Yuan-Tong, an academician renowned for his work in solving the puzzle of Pompe disease. Pompe disease is a rare genetic disorder that causes muscle weakness that progressively worsens over time. Dr. Chen Yuan-Tong was able to solve the mystery of Pompe disease by using Lorenzo's oil. Could you identify which of the following mechanisms and deficiency enzymes are incorrect based on Pompe disease?
- (A) muscle-type of the glycogen phosphorylase, GSD-V
 - (B) acid alpha-glucosidase, GSD-II
 - (C) allows glycogen to build up to toxic levels in the lysosome
 - (D) a deficiency in liver glycogen phosphorylase
54. Which the following descriptions of carbohydrate metabolism disorders are correct?
- (A) Lactose intolerance—Fermentation of lactose produces methane and hydrogen in the small intestine.
 - (B) Galactosemia—Caused by GALT deficiency, resulting in growth retardation, liver failure, and sepsis in newborns.
 - (C) Fructosia—A condition inherited in a dominant manner, caused by fructokinase deficiency, also known as essential fructosuria.
 - (D) Sorbital accumulation—Manifests as cataracts, retinopathy, and peripheral neuropathy.
55. Palace battle dramas often depict a ritual where two people mix their blood, if it coagulates, then they are considered related. However, in scientific practice, blood types are determined by identifying blood antigens. Which statements are incorrect regarding blood types?
- (A) O type — recognized by H antigen
 - (B) A type — galactosamine (GlcN) conjugated by galactosamine transferase on H antigen
 - (C) B type — D-glucuronic acid (GlcA) conjugated by glucuronosyl transferases on H antigen
 - (D) AB type — recognized by A, B and H antigen
56. Which of the following statements are incorrect in describing a biochemical process or phenomenon related to ketone bodies?
- (A) Legal reaction allows the testing of acetoacetate and nitroferricyanide's purple complex under acidic conditions.
 - (B) In acute diabetic ketoacidosis, the ratio of β -hydroxybutyrate: acetoacetate=10:1 in plasma.
 - (C) During starvation, a low ratio of NADH/NAD⁺ inhibits the TCA cycle and increases ketone body production.
 - (D) In the brain, one acetoacetate molecule yields two acetyl CoA molecules, resulting in 24 ATP production at the end of the TCA cycle.

57. Which statements accurately describe the physiological activity of eicosanoids in the arachidonic acid pathway?
- (A) Corticosteroids inhibit phospholipase A2, resulting in decreased levels of prostaglandins, thromboxanes, and leukotrienes.
 - (B) Leukotrienes (LT) promotes the contraction of smooth muscle, contraction of airway, trachea, and small intestine, and increases microvascular permeability, leading to edema.
 - (C) Rofecoxib, a selective COX-II inhibitor, was withdrawn from the market due to its concurrent production of thromboxane while generating PGI₂, resulting in myocardial infarction.
 - (D) PGE₂ (Prostaglandin E₂) is commonly used as a labor-inducing agent in clinical practice mainly because it promotes the contraction of uterine smooth muscles, thereby initiating uterine contractions and facilitating the progression of labor.
58. Which statements regarding hyperlipidemia are incorrect?
- (A) **Type I:** Children can inherit this from their parents, and it usually presents when people are young. Type I disrupts how the body breaks down fats, leading to a severe buildup of VLDL.
 - (B) **Type IIa:** Also known as familial hypercholesterolemia, this type occurs due to a gene alteration and causes both high cholesterol and high triglycerides. **Type IIb:** A variation in a specific gene causes high levels of LDL cholesterol.
 - (C) **Type III:** An increase in intermediate-density lipoproteins (IDL) sets type III apart. This type is genetic and affects how the body breaks down lipids, causing them to build up.
 - (D) **Type IV:** This type usually leads to increased VLDL and triglycerides but normal cholesterol. The major reason is the deficiency of apoE.
59. Consider the symptoms associated with bile duct obstruction due to gallstones: patients often present with upper abdominal pain, fever, and potential inflammation. Some individuals may experience generalized abdominal discomfort without clear localization. Based on physiological characteristics and possible biochemical mechanisms, which statements accurately explain these observations?
- (A) Bile acids form covalent bonds with glycine through an amide linkage, raising their pK_a value and augmenting their emulsifying properties.
 - (B) Cholesterol can undergo metabolism to produce 7 α -hydroxycholesterol catalyzed by cholesterol 7 α -hydroxylase, a process that is expedited by elevated levels of bile acids.
 - (C) Cholestyramine is not a resorption resin binding to bile acid to enhance elimination. However, cholestyramine may bind to vit. A, D, E, K and inhibit their absorption.
 - (D) Bile salts are metabolized by bacteria in the small intestine to form secondary bile acids. Oral administration of ursodeoxycholic acid, a secondary bile acid, can aid in dissolving cholesterol in bile, thereby dissolving gallstones ranging from small to medium in size.
60. Which pairs of the disease correlated the hormone metabolism are correct?
- (A) Conn syndrome – progesterone $\rightarrow\rightarrow$ aldosterone
 - (B) Cushing syndrome – 17- α -hydroxyprogesterone $\rightarrow\rightarrow$ cortisol
 - (C) Benign prostatic hyperplasia – testosterone $\rightarrow\rightarrow$ dihydrotestosterone
 - (D) Virilism – pregnenolone $\rightarrow\rightarrow$ 11-deoxycorticosterone
61. Which pairs of the following amino acid and its derivative are incorrect?
- (A) Tyr – serotonin
 - (B) Trp – dopamine
 - (C) Arg – urea
 - (D) Gly – hemoglobin

第三部分：問答題

EGFR mutations are often associated with the development of carcinomas, such as lung, breast, and colorectal cancers. There are various clinical treatment strategies available to target EGFR. In the case of a patient who has a confirmed EGF receptor with a truncated extracellular domain. Based on the EGFR genotype of this patient, please state whether the following can be implemented. Explain and justify your answers (2% for each). (Answer in Chinese or English is ok)

- (1) EGF-neutralizing antibodies
- (2) EGFR -neutralizing antibodies
- (3) Tyrosine kinase inhibitors

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科目：普通生物及生化概論

題號	答案	題號	答案	題號	答案	題號	答案	題號	答案	題號	答案	題號	答案
1.	D	16.	B	31.	C	46.	B	61.	AB	76.		91.	
2.	A	17.	D	32.	A	47.	D	62.		77.		92.	
3.	C	18.	C	33.	A	48.	C	63.		78.		93.	
4.	D	19.	A	34.	D	49.	BC	64.		79.		94.	
5.	B	20.	A	35.	B	50.	ABC	65.		80.		95.	
6.	E	21.	D	36.	B	51.	CD	66.		81.		96.	
7.	C	22.	B	37.	A	52.	ACD	67.		82.		97.	
8.	B	23.	B	38.	C	53.	AD	68.		83.		98.	
9.	A	24.	B	39.	A	54.	ABD	69.		84.		99.	
10.	E	25.	C	40.	D	55.	BCD	70.		85.		100.	
11.	C	26.	B	41.	B	56.	AC	71.		86.			
12.	B	27.	C	42.	A	57.	ABCD	72.		87.			
13.	B	28.	B	43.	D	58.	ABD	73.		88.			
14.	D	29.	B	44.	C	59.	CD	74.		89.			
15.	C	30.	A	45.	A	60.	ABCD	75.		90.			

醫
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國立中興大學 113 學年度學士後醫學系招生考試

試題參考答案疑義釋疑公告

科目	題號	疑義答覆	釋疑結果
普通生物及生化概論	32	Protein folding follows the 2nd law of thermodynamics. In the description, water effects may be involved in the change of the entropy of the system.	答案更改為(A) 或(B)

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普通生物

張劍鴻(張芸潔)老師提供

中興大學 113 學年度 學士後醫學系 生物試題命題範疇分析

- ◆ 本年度中興後醫的普通生物及生化概論共有 64 題，試卷總分為150分，配分如下：
 - (1) 第 1 -22題，單選題，每題 3 分，共66分。
 - (2) 第23-48題，單選題，每題 2 分，共52分。
 - (3) 第49-61題，複選題，每題 2 分，共26分。
 - (4) 三題問答題，每題 2 分，共6分。
- ◆ 單選題的部分涵蓋生物題及生化題；複選題的部分均為生化題。在此針對第 1-22 的三分題部分做解析、如下表。
- ◆ 應考策略：中興大學生物試題的第 1-22 題，全數為生物學課本 Campbell 的生物領域概念。甚至其中，第6、7、15、19題等四題均為出現在講義溫古知新的考古題。若能循正規的方式準備，確實熟悉 Campbell 生物學之概念，在這66分當中，要有60以上的優秀表現並不困難。

生物各試題命題範疇分析

		第 1-22題，三分題
1	Unit 3 生物化學	Competitive inhibitors，完全命中：Competitive inhibition can be overcome by increasing the concentration of the substrate. 正課講義：Chap 15 生物巨分子，page 99 複習課程：Unit 3 Biochemistry, page 8
2	Unit 2 動物生理學	Respiratory surfaces，完全命中：The rate of diffusion is proportional to the surface area across which diffusion occurs, and inversely proportional to the square of the distance through which molecules must move. 正課講義：Chap 9 運輸系統，page 203 複習課程：Unit 2 Animal Physiology, page 29
3	Unit 1 細胞生物學	RTK signaling，完全命中：...ligands bind to two receptors, causing the two receptors to aggregate and form a dimer... 正課講義：Chap 3 細胞訊號傳遞，page 21 複習課程：Unit 1 Cell Biology, page 10
4	Unit 4 分子生物學	Control of Gene Expression，命中：cell signaling, and cancer 正課講義：Chap 23 基因表現控制，page 107
5	Unit 1 細胞生物學	Receptor-mediated endocytosis，完全命中 正課講義：Chap 2 細胞膜，page 47
6	Unit 1 細胞生物學	microfilaments forms a cleavage furrow，完全命中：溫古知新 # 110，Cytochalasin B 可阻斷微絲 (microfilament) 形成 正課講義：Chap 1 細胞構造和功能，page 93 複習課程：Unit 1 Cell Biology, page 6
7	Unit 4 分子生物學	Steps of meiosis，完全命中：溫古知新 # 54 正課講義：Chap 18 減數分裂，page 26, page 64 複習課程：溫古知新 # 9, Unit 4 Molecular Biology, page 42

8	Unit 5 生物科技	Reproductive cloning of mammals, 完全命中 正課講義: Chap 24 DNA 科技, page 63-64 複習課程: Unit 5 Biotechnology, page 4
9	Unit 4 分子生物學	Differential gene expression, 完全命中: The differences between cell types are due to differential gene expression 正課講義: Chap 23 基因表現控制, page 34 複習課程: Unit 4 Molecular Biology, page 35
10	Unit 7 微生物免疫學	The humoral immune response, 完全命中 正課講義: Chap 26 感染之防禦, page 51-57 複習課程: Unit 6 Microbiology and Immunology, page 14
11	Unit 2 動物生理學	Brain cortex, 完全命中: Language and speech are localized in the cerebrum 正課講義: Chap 6 神經系統, page 58-59 複習課程: Unit 2 Animal Physiology, page 11
12	Unit 2 動物生理學	Endocrine signaling, 完全命中 正課講義: Chap 10 內分泌, page 15 複習課程: Unit 2 Animal Physiology, page 33-34
13	Unit 8 演化學	Natural selection, 完全命中: increase or decrease heritable traits that vary in a population 正課講義: Chap 33 演化機制, page 12 複習課程: Unit 8 Evolution, page 15
14	Unit 8 演化學	Hardy-Weinberg Equilibrium, 完全命中: five conditions for nonevolving populations 正課講義: Chap 33 演化機制, page 53 複習課程: Unit 8 Evolution, page 17-18
15	Unit 8 演化學	chitin, 完全命中: 溫古知新 #64 正課講義: Chap 31 真菌, page 61 複習課程: Unit 8 Evolution, page 3 and 10
16	Unit 7 植物學	Nonvascular plants (bryophytes), 完全命中 正課講義: Chap 30 植物多樣性, page 14 複習課程: Unit 7 Plant Biology, page 31

17	Unit 8 演化學	Separation, 完全命中 : Reproductive Isolation 正課講義 : Chap34 物種起源, page 54-57 複習課程 : Unit 8 Evolution, page 21
18	Unit 7 植物學	Life cycle of angiosperms, 完全命中 正課講義 : Chap30 植物多樣性, page 83 複習課程 : Unit 7 Plant Biology, page 46
19	Unit 9 生態學	Batesian mimicry, 完全命中 : harmless mimics harmful model ; 溫古知新 # 34- 101 高醫後醫考題 正課講義 : Chap37 多樣性和群落, page 7 複習課程 : Unit 9 Ecosystems, page 7
20	Unit 9 生態學	Terrestrial biomes, 完全命中 : Tundra-vegetation is herbaceous 正課講義 : Chap35 生態學概論, page 22-23 複習課程 : Unit 9 Ecosystems, page 2
21	Unit 9 生態學	Evolution of behavior, 完全命中 : Inclusive Fitness- Kin Selection 正課講義 : Chap38 生態系, page 84-85 複習課程 : Unit 9 Ecosystems, page 14
22	Unit 9 生態學	Aquatic biomes, 完全命中 : eutrophic lakes-nutrient-rich and often depleted of oxygen 正課講義 : Chap35 生態學概論, page 35 複習課程 : Unit 9 Ecosystems, page 3

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生化概論

莊老師(施政安)老師提供

A.113 年度中興後西醫試題命中分析

Part I

題號	講義	總復習	實戰解析
1	2-144 (competitive inhibition)	-	T3-3
3	5-149 (signal transduction)	p.14	T3-38
4	5-121 (nuclear receptor)	-	-
5	4-270 (LDL)	-	-
9	5-113 (signal transduction)	p.15	T2-40
23	6-242 (retrovirus)	-	-
25	6-211 (transcription)	p.55	-
26	6-211 (transcription)	-	-
27	6-214 (histone code)	p.10	-
28	2-45 (Northern blot)	p.42	-
29	6-163 (translation)	-	-
30	上課筆記(alternative splicing)	-	-
31	6-216 (operon)	-	-
32	1-305(爭議)	-	-
33	6-82~84 (pyrimidine dimer)	-	-
34	6-118 (上課筆記)	-	-
35	上課筆記	-	-
36	6-164 (爭議)	-	-
37	3-29 (base pairing)	-	-
38	6-152(splicing site)	-	T2-2
39	6-40 (DNA Pol I)	-	-
40	上課筆記	-	-
41	6-115	-	-
42	6-168 (translation)	-	-
43	6-176 (polysome)	-	-
44	6-183 (translation)	-	-
45	6-232 (siRNA)	-	-
46	上課筆記(gene expression)	-	-
47	6-209 (gene control)	-	-
48	6-133 (CTD of RNA Pol II)	-	-

Part II42

題號	講義	總復習	實戰解析
49	5-17~29 (vitamin)	-	-
50	3-189 (alcohol metabolism)	-	-
52	3-171 (GLUT1-7)	-	-
53	3-239	-	-
54	none	-	-
56	none	-	-
57	none	-	-
61	4-87 (amino acid)	-	-

Part III: 總復習 p.14

(註: 符號含義: 4-39 = 第四回講義第39頁; p.25 = 總復習講義第25頁;
 T1-7 = 實戰解析試題Test one/第7題; T2-33 = 實戰解析試題
 Test two/第33題; T3-2 = 實戰解析試題Test three/第2題)

B. 113 年度中興後西醫試題爭議題分析

32) Protein folding 的 entropy 有兩種:

(1) Conformational entropy (decrease) unfavors the protein folding.

則選 (D)

(2) Water's entropy /or hydrophobic effect (increase) favors the protein folding.

則選 (A)

(van Holde et al,.Biochemistry, 2013, 4th editionp.196-199)

36) *Proofreading functions of Ribosome:

(1) initial selection (codon recognition)

(2) accommodation

故(A) (B) 皆可

(*Rodnina and Wintermeyer, Fidelity of aminoacyl-tRNA selection on the ribosome: kinetic and structural mechanisms, Annual Review of biochemistry, 2001, vol 70, p.415)

(*Watson et al, Molecular biology of the gene, 7th edition, 2014, p.537-539)

其他試題詳解，歡迎參考高點出版 67MU2023【生化概論歷屆試題詳解】一書，
 學士後相關書籍出版詳情，請上[高點網路書店](#)查詢。