

臺北醫學大學 103 學年度碩士班暨碩士在職專班招生入學考試

基礎生物化學試題

本試題第 1 頁；共 2 頁
(如有缺頁或毀損，應立即請監試人員補發)

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| 注意事項 | 一、本試題共二大題，共計 100 分。
二、請將最適當的答案依題號作答於答案卷上。
三、試題答錯者不倒扣；題次號碼錯誤或不按順序或鉛筆作答，不予計分。 |
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一、選擇題：每題 2%，共 50%

- Which of the following is a non-essential amino acid?
(A) valine (B) leucine (C) isoleucine (D) serine
- An intermediate of purine degradation in humans is:
(A) NH_4^+ (B) succinate (C) urea (D) uric acid
- Insulin is an example of a(n) _____ hormone.
(A) peptide (B) catecholamine (C) eicosanoid (D) steroid
- When blood glucose is abnormally high, the pancreas releases:
(A) epinephrine (B) glucagon (C) glucose (D) insulin
- Long-term maintenance of body weight is regulated by the hormone of:
(A) adiposin (B) obesin (C) leptin (D) testosterone
- Which of the following molecules is derived from sterols?
(A) arachidonic acid (B) gangliosides (C) prostaglandins (D) vitamin D
- Select the correct match of the compounds on the left with the important roles they play listed on the right.
(A) sphingolipids — necessary for sight
(B) thromboxanes — mediates pain and inflammation
(C) vitamin A — important component of myelin membranes
(D) leukotriene — smooth muscle contraction
- Match each of these vitamins with its biological role:
(A) vitamin B — vision (B) vitamin D — prevention of oxidative damage
(C) vitamin E — Ca^{2+} and phosphate metabolism (D) vitamin K — blood clotting
- Which of the following statements about sterols is true?
(A) All sterols share a fused-ring structure with four rings.
(B) Sterols are soluble in water, but less so in organic solvents such as chloroform.
(C) Stigmasterol is the principal sterol in fungi.
(D) The principal sterol of animal cells is ergosterol.
- A condensed eukaryotic chromosome is known to be associated with all of the following proteins, except for:
(A) histone H1 (B) SMC proteins (C) topoisomerase I (D) topoisomerase II
- Which of the following does not contribute to the octameric histone core?
(A) H1 (B) H2A and H2B (C) H3 (D) H4
- A highly conserved protein that is involved in protein degradation is:
(A) ricin (B) peptidyl transferase (C) ubiquitin (D) degradase
- Which enzyme attaches the correct amino acid to its tRNA?
(A) aminoacyl-tRNA synthase (B) aminoacyl-tRNA synthetase
(C) aminoacyl-tRNA transferase (D) aminoacyl-tRNA ligase
- Which inhibitor of protein synthesis competes with aminoacyl-tRNAs for binding to the A-site of the ribosome?
(A) puromycin (B) erythromycin (C) streptomycin (D) cycloheximide

15. Which of the following is true of the topoisomerases II?
- I. transiently breaking one of the two DNA strands
 - II. break both DNA strands
 - III. change Lk in increments of 1
 - IV. change Lk in increments of 2
- Ⓐ I, III Ⓑ I, IV Ⓒ II, III Ⓓ II, IV
16. Which of the following polymerases does not require a template ?
- Ⓐ RNA pol I Ⓑ polyadenylate polymerase Ⓒ RNA pol II Ⓓ reverse transcriptase
17. Which of the following mechanisms can send amino group to be catabolized from skeletal muscle cells to liver cells?
- Ⓐ aspartate-argininosuccinate shunt Ⓑ malate-aspartate shunt
- Ⓒ urea cycle Ⓓ glucose-alanine cycle
18. Which of the following compounds is not the intermediate during the urea cycle?
- Ⓐ pyruvate Ⓑ ornithine Ⓒ arginine Ⓓ citrulline
19. Which of the following compounds directly donates a nitrogen atom for the formation of urea during the urea cycle?
- Ⓐ aspartate Ⓑ oxaloacetate Ⓒ glutamate Ⓓ ornithine
20. Which of the following amino acids are both ketogenic and glucogenic?
1. valine 2. isoleucine 3. histidine 4. arginine 5. tyrosine
- Ⓐ 2 and 5 Ⓑ 1, 3 and 5 Ⓒ 2 and 4 Ⓓ 2, 4 and 5
21. Which of the following compounds is the cofactor for pyruvate carboxylase?
- Ⓐ biotin Ⓑ niacin Ⓒ folate Ⓓ thiamine
22. Which of following compounds can not be converted to oxaloacetate?
- Ⓐ pyruvate Ⓑ leucine Ⓒ malate Ⓓ aspartate
23. During oxidative phosphorylation, the proton motive force that is generated by electron transport is used to:
- Ⓐ create a pore in the inner mitochondrial membrane.
- Ⓑ generate the substrates (ADP and Pi) for the ATP synthase.
- Ⓒ induce a conformational change and release ATP in the ATP synthase.
- Ⓓ reduce O₂ to H₂O.
24. Which of the followings is the major reaction of oxidative phosphorylation?
- Ⓐ pyruvate synthesis Ⓑ phosphorylation of glucose
- Ⓒ NADH synthesis Ⓓ ATP synthesis
25. During hypoxia, which of the following conditions can be found to prevent ROS (Reactive oxygen species) maximal generation in cells?
- Ⓐ The expression level of HIF-1(Hypoxia-induced factor-1) is decreased.
- Ⓑ The expression level of complex IV is increased.
- Ⓒ The activity of pyruvate dehydrogenase is increased.
- Ⓓ The activity of pyruvate dehydrogenase kinase is increased.

二、問答題：共計 50%

1. Please describe the complete citric acid cycle with the name of each step, enzyme and its products. (20%)
2. Please describe the sequence of events in the synthesis of proteins on the rough endoplasmic reticulum. (20%)
3. Please write down the name of the following amino acids represented by each of the following letter. (每小題 2%，共 10%)
(1) Q: (2) E: (3) N: (4) W: (5) Y: