

大葉大學 101 學年度 研究所碩士班 招生考試試題紙

系 所 別	組 別	考 試 科 目 (中文名稱)	考 試 日 期	節 次	備 註
藥用植物與保健學系 碩士班	甲	生物化學	3 月 17 日	第 1 節	共二頁 P 2-1

說明 1：可否攜帶特殊作答輔助工具：否 是，考生可使用 \_\_\_\_\_ (如未註明，一律不准攜帶)

10:30~12:00

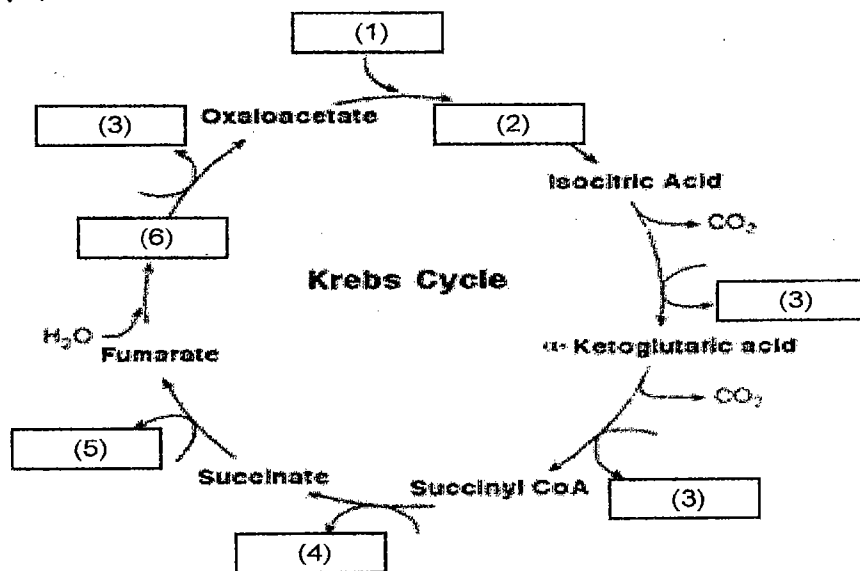
一、單選題 (50%) 每題 2 分

- ( )  $\alpha$ -胺基酸中的胺基(-NH<sub>2</sub>)與羧基(-COOH)，其 pKa 值分別為 10 和 2，當 pH 接近中性時，胺基會接受一個質子，而羧基則失去一個質子(proton)，這個狀態或現象稱為：(A)異構現象[isomerization] (B)中和現象[neutralization] (C)兩性離子[zwitterions] (D)立體異構現象[stereoisomerization](E)縮合現象[condensation]。
- ( ) 蛋白質於 280nm 波長有高吸光值，主要是因為含有下列何種胺基酸?(A)Ala (B)Cys (C)Met (D)Trp (E)Leu。
- ( ) 胰蛋白酶(Trypsin)切於蛋白質內何種胺基酸之羧端?(A)Phe (B)Lys (C)Met (D)Asp (E)His。
- ( ) 在 pH7.0 的環境下，peptide: Ala-Gly-Glu-Pro 之靜電荷(net charge)為何?(A)-2 (B)-1 (C)0 (D)+1 (E)+2。
- ( ) 有一寡肽之胺基酸序列是 ARVYIMPF，當以溴化氰作用後，得到的產物中有下列何種雙肽(Dipeptide)?(A)PF (B)AR (C)IM (D)VY (E)YL。
- ( ) A sequence of amino acids in a certain protein is found to be -Ser-Gly-Pro-Gly-. The sequence is most probably part of a(n): (A) antiparallel  $\beta$ -sheet (B) parallel  $\beta$ -sheet (C)  $\alpha$ -helix (D)  $\beta$  turn (E)  $\alpha$ -sheet.
- ( ) An average protein will not be denatured by: (A) pH 10 (B) heating to 90 °C (C) urea (D) iodoacetic acid (E) a detergent such as sodium dodecyl sulfate.
- ( ) Which of the following is not known to be involved in the process of assisted folding of proteins? (A) Peptide bond hydrolysis (B) Peptide bond isomerization (C) Chaperonins (D) Disulfide interchange (E) Heat shock proteins.
- ( ) When oxygen binds to a heme-containing protein, the two open coordination bonds of Fe<sup>2+</sup> are occupied by: (A) One O<sub>2</sub> molecule and one amino acid atom (B) One O atom and one amino acid atom (C) One O<sub>2</sub> molecule and one heme atom (D) Two O atoms (E) Two O<sub>2</sub> molecules.
- ( ) In the binding of oxygen to myoglobin, the relationship between the concentration of oxygen and the fraction of binding sites occupied can best be described as: (A) linear with a negative slope (B) linear with a positive slope (C) hyperbolic (D) sigmoidal (E) random.
- ( ) Cholesterol is synthesized from: (A)acetyl-CoA (B)choline (C)lipoic acid (D)malate (E)oxalate.
- ( ) The synthesis of glycogen, starch, and sucrose all: (A) involve addition of a sugar residue at the reducing end of the growing polymer. (B) take place in liver and muscle of mammals. (C) use a sugar nucleotide as substrate. (D) use glucose 1-phosphate as the only substrate. (E) use glucose-6-phosphate as substrate.
- ( ) The immediate precursors of DNA and RNA synthesis in the cell all contain: (A) 3' triphosphates. (B) 5' triphosphates. (C)adenine. (D) deoxyribose. (E)ribose.
- ( ) The force that drives an ion through a membrane channel depends upon: (A) the charge on the membrane. (B) the difference in electrical potential across the membrane. (C) the size of the channel. (D) the size of the ion. (E) the size of the membrane.
- ( ) Which of the following is not usually essential for the catalytic activity of ribozymes? (A) Correct base pairing (B) Correct base sequence (C) Correct interaction with protein (D) Correct secondary structure (E) Correct three-dimensional structure.
- ( ) Which one of the following types of mechanisms is not known to play a role in the reversible alteration of enzyme activity? (A) Activation by cleavage of an inactive zymogen (B) Allosteric response to a regulatory molecule (C) Alteration of the synthesis or degradation rate of an enzyme (D)Covalent modification of the enzyme (E) Interactions between catalytic and regulatory subunits.
- ( ) The conversion of 1 mol of fructose 1,6-bisphosphate to 2 mol of pyruvate by the glycolytic pathway results in a net formation of: (A) 1 mol of NAD<sup>+</sup> and 2 mol of ATP. (B) 1 mol of NADH and 1 mol of ATP. (C) 2 mol of NAD<sup>+</sup> and 4 mol of ATP. (D) 2 mol of NADH and 2 mol of ATP. (E) 2 mol of NADH and 4 mol of ATP.
- ( ) Glycolysis is the name given to a metabolic pathway occurring in many different cell types. It consists of 11

- enzymatic steps that convert glucose to lactic acid. Glycolysis is an example of: (A) aerobic metabolism. (B) anabolic metabolism. (C) a net reductive process. (D) fermentation. (E) oxidative phosphorylation.
19. ( ) Chargaff's rules state that in typical DNA: (A) A = G. (B) A = C. (C) A = U. (D) A + T = G + C. (E) A + G = T + C.
20. ( ) B-form DNA in vivo is a \_\_\_\_\_-handed helix, \_\_\_\_\_ Å in diameter, with a rise of \_\_\_\_\_ Å per base pair. (A) left; 20; 3.9 (B) right; 18; 3.4 (C) right; 18; 3.6 (D) right; 20; 3.4 (E) right; 23; 2.6.
21. ( ) Which of the following is a palindromic sequence? (A) AGGTCC TCCAGG (B) CCTTCC GCAAGG (C) GAATCC CTTAGG (D) GGATCC CCTAGG (E) GTATCC CATAGG.
22. ( ) A convenient cloning vector with which to introduce foreign DNA into *E. coli* is a(n): (A) *E. coli* chromosome. (B) messenger RNA. (C) plasmid. (D) yeast "ARS" sequence. (E) yeast transposable element.
23. ( ) The PCR reaction mixture does *not* include: (A) all four deoxynucleoside triphosphates. (B) DNA containing the sequence to be amplified. (C) DNA ligase. (D) heat-stable DNA polymerase. (E) oligonucleotide primer(s).
24. ( ) RFLP is a: (A) bacteriophage vector for cloning DNA. (B) genetic disease. (C) plasmid vector for cloning DNA. (D) protein. (E) variation in DNA base sequence.
25. ( ) Which of the following is *not* a fat-soluble vitamin? (A) A (B) C (C) D (D) E (E) K.

二、問答題 (50%) 每題 5分

1. 下列哪些是「必需胺基酸」。  
Alanine (Ala)、Arginine (Arg)、Aspartate (Asp)、Asparagine (Asn)、Cysteine (Cys)、Glycine (Gly)、Glutamate (Glu)、Glutamine (Gln)、Histidine (His)、Isoleucine (Ile)、Lysine (Lys)、Leucine (Leu)、Methionine (Met)、Phenylalanine (Phe)、Proline (Pro)、Serine (Ser)、Threonine (Thr)、Tyrosine (Tyr)、Tryptophan (Trp)、Valine (Val)
2. 名詞解釋  
(1)何謂 Superoxide Dismutase (SOD)，其功能為何 (2%)  
(2)試解釋 IC50 (2%)  
(3)試解釋 EC50。(1%)
3. 請說明 DHA (Docosahexaenoic acid) 與人體的關係。  
(1)DHA 與大腦細胞發育的關係 (2%) (2) DHA 與視力的關係 (1%) (3) DHA 抑制發炎的作用 (1%) (4) DHA 與胎兒發育的關係 (1%)
4. 為何葡萄糖在人體內不以單醣型式存在，而以多醣形式的肝醣 (glycogen) 存在? (1%)
5. 請問玻尿酸之結構，其功能為何。
6. 請完成下列檸檬酸循環簡圖。



7. 請列出引起蛋白質變性 (Denaturation of proteins) 的因子。
8. 請簡述蛋白質在生物裡主要有哪幾種功能(the function of proteins)。
9. 請問什麼是 Low Density Lipoprotein (LDL)及 High Density Lipoprotein (HDL)，它們對人體的影響為何。
10. 試從生化觀點闡述痛風 (metabolic arthritis) 發生的原因及如何治療。