

# 國立臺北科技大學 102 學年度碩士班招生考試

系所組別：3610 生化與生醫工程研究所甲組

## 第一節 生物化學 試題

第一頁 共二頁

### 注意事項：

1. 本試題共【五】大題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

一、單選題【15】題，每題【4】分，共 60 分 (請務必將答案填寫於答案紙上)

1. Which of the following molecules is amphipathic?
  - a) glucose
  - b) sodium chloride
  - c) phenol
  - d) palmitic acid
2. Which amino acid has the one-letter symbol Q?
  - a) Leucine
  - b) Glutamine
  - c) Threonine
  - d) Phenylalanine
3. Which group consists only of amino acids with basic side chains?
  - a) Phe & Ile
  - b) Thr & Tyr
  - c) Pro & Val
  - d) Lys & His
4. Which of the following amino acids is unlikely to be found in an  $\alpha$ -helix structure of protein?
  - a) Proline
  - b) Lysine
  - c) Methionine
  - d) Aspartic acid
5. Determination of the sequence of amino acids in a peptide is done by
  - a) x-ray crystallography
  - b) trypsin hydrolysis
  - c) Edman degradation
  - d) HCl hydrolysis
6. The higher  $K_m$  of enzyme means:
  - a) the substrate is preferred by enzyme
  - b) the substrate is not preferred by enzyme
  - c) enzyme with higher turnover rate
  - d) enzyme with lower turnover rate
7. Which type of the enzymatic reactions is usually required biotin?
  - a) ATP hydrolysis
  - b) redox reactions
  - c) coenzyme A activations
  - d) carboxylation reactions
8. Common table sugar is composed of the following simple sugars:
  - a) glucose and galactose
  - b) two molecules of glucose
  - c) glucose and fructose
  - d) two molecules of fructose
9. What is the major purpose that pyruvate is reduced to lactate in muscle cells during anaerobic metabolism?
  - a) to reduce the amount of NADH for increasing the efficiency of glycolysis
  - b) to recycle the NAD<sup>+</sup> for maintaining glycolysis
  - c) to reduce the amount of pyruvate for stopping citrate acid cycle
  - d) to accumulate the reducing power in lactate for maintaining ATP synthesis in mitochondria
10. All the branched-chain structure of glycogen is initiated from:
  - a) glucose
  - b) glycogen synthase
  - c) uridine diphosphate glucose
  - d) glycogenin
11. Which of the following enzymes does not use NAD<sup>+</sup> for oxidation?
  - a) isocitrate dehydrogenase
  - b) glyceraldehyde-3-phosphate dehydrogenase
  - c) succinate dehydrogenase
  - d) malate dehydrogenase

注意：背面尚有試題

12. Uncoupling in mitochondria refers to:
- a) blocking the electrons from NADH and FADH<sub>2</sub> entering the electron transport system
  - b) stopping ATP synthesis but not stopping electron flow
  - c) interruption of electron flow
  - d) stopping electron flow but not stopping ATP synthesis
13. Lipids yield more ATP than sugars because:
- a) their carbon atoms are more highly reduced
  - b) they have more carbon atoms than sugars
  - c) neither of these
  - d) both of these
14. The process of ATP synthesis in chloroplasts is referred to as:
- a) reductive phosphorylation
  - b) oxidative phosphorylation
  - c) substrate-level phosphorylation
  - d) photophosphorylation
15. Fluorouracil is an effective inhibitor of:
- a) thymidylate synthase
  - b) ribonucleotide reductase
  - c) xanthine oxidase
  - d) carbamoyl phosphate synthetase

二、請以生物化學的角度來說明，為何短時間飢餓的減肥方式，失去的體重在正常進食後很容易回復的原因。本題【10】分

三、請說明在那些作用力的影響下，使得單一基因的蛋白質產物，在細胞質內被轉譯(translation)出來後，都會摺合成相同的立體構型？本題【10】分

四、假設你現在所處的特定環境中，可以輕易地取得潔淨的水，各種維他命，以及各種礦物質，但食物種類上卻只有三種，分別為綜合性的醣類，脂質，以及蛋白質。若這三種食物中，你只能選擇其中的兩類，那麼你應該選擇哪兩類，以達到長時間正常生活的目的？並請說明你的理由。本題【10】分

五、一個微生物的蛋白質，其分子量大約是 110 kDa，請合理的估計其編碼序列(coding sequence)約是由多少個鹼基對(base pair)所組成，並詳列其計算方式。本題【10】分