

國立臺北科技大學 112 學年度碩士班招生考試

系所組別：3601

化學工程與生物科技系生化與生醫工程碩士班

第一節 生物化學 試題 (選考)

第 1 頁 共 2 頁

注意事項：

1. 本試題共三大題，共 100 分。
2. 不必抄題，作答時請將試題題號及答案依照順序寫在答案卷上。
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、多重選擇題(單、複選混合，每題全答對得 3 分，答錯不倒扣) (45%)

1. Which of the following is an enzyme that catalyzes the transfer of phosphate groups from high-energy, phosphate-donating molecules to specific substrates
(A) ligase (B) kinase (C) phosphatase (D) proteinase
2. Which of the following chemical is the energy currency of the cell?
(A) ATP (B) fat acid (C) lipid (D) sugar
3. Which of the following is the metabolic pathway which stores excess glucose for use by the body at a later time.
(A) gluconeogenesis (B) glutamine (C) glycogenolysis (D) glycogenesis
4. Which of the following is a biopolymer?
(A) cellulose (B) glucose (C) DNA (D) RNA
5. Which of the following organelle contains DNA?
(A) chloroplast (B) lysosome (C) nucleus (D) mitochondria
6. Which of the following is amino acid?
(A) alanine (B) arginine (C) guanine (D) tryptophan
7. Which enzymes are required for DNA replication in cells?
(A) DNA polymerase (B) helicase (C) restriction enzyme (D) RNA primase
8. Which of the following is the template of transcription ?
(A) carbohydrate (B) DNA (C) mRNA (D) protein

9. Which of the following is required for translation?

(A) dNTP (B) mRNA (C) ribosome (D) tRNA

10. 下列何者抑制 gene expression?

(A) compressor (B) inhibitor (C) repressor (D) suppressor

11. 下列敘述何者正確?

(A) 在原核細胞中，promoter 是一段 DNA 片段，RNA polymerase 與其結合以從 promoter 的下游啟動轉錄

(B) 在真核細胞中，RBS 是一段 RNA 片段，ribosome 與其結合以從 RBS 的下游第一個 AUG codon 啟動轉譯

(C) reverse transcriptase 是一種用於催化從 RNA 模板生成互補 DNA (cDNA) 的酶

(D) RNA replicase 是一種催化從 RNA 模板生成互補 RNA 的酶

12. Which of the following contains intron ?

(A) *Bacillus subtilis* (B) human (C) rose (D) yeast

13. Which of the following is used to detect protein?

(A) ELISA (B) Northern blotting (C) Southern blotting (D) Western blotting

14. 下列有關 polymerase chain reactions 的敘述何者正確?

(A) 需要 DNA primers

(B) 每一個循環有三個步驟而且每一個循環增加兩倍目標 DNA 的量

(C) 需要 dATP, dCTP, dGTP, dTTP

(D) annealing temperature 須小於 primer 的 melting temperature

15. 下列有關 SARS-CoV-2 的敘述何者正確?

(A) 其遺傳物質為 ssRNA (B) 其 N protein 為 capsid

(C) 其 S protein 為讓病毒附著在宿主細胞膜上並與之融合的蛋白質

(D) 其 envelope 包含 S, E, M proteins 以及 lipid bilayers

二、Explain the following terminology (15% , each 3%)

(1) allosteric enzyme

(2) competitive inhibitor

(3) melting temperature of DNA

(4) isoelectric pH of protein

(5) protein folding chaperones

注意：背面尚有試題

三、問答題 (40%)

1. Describe the process of converting pyruvate to lactate. (5%)
2. Describe the pathway of converting pyruvate to ethanol. (10%)
3. Describe the process of converting triacylglycerols to glycerol. (5%)
4. Describe the regulation of *lac* operon in *E. coli*. (20%)