

# 臺北醫學大學 100 學年度碩士班暨碩士在職專班招生入學考試

生物化學試題

本試題第1頁；共1頁

(如有缺頁或毀損，應立即請監試人員補發)

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| 注意<br>事項 | 一、本試題共二大題，共計 100 分。<br>二、請將正確答案依題次作答於答案用卷內。<br>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、簡答題(86%)

1. 就生物體的能量儲存而言，試說明為何以 lipid 儲存能量的效率較 glycogen 為佳？(8%)
2. 真核與原核生物於合成 mRNA 過程中最大的差別在於前者有 mRNA processing。就您所知，有幾種 mRNA processing 過程？其重要性為何？(10%)
3. 說明 acyclover 藥物如何利用抑制 DNA replication 達成治療 herpes simplex virus 之感染。(8%)
4. 說明 tRNA、rRNA 及 mRNA 如何協助蛋白質之合成？(10%)
5. Histones are proteins found in eukaryotic cell nuclei, and tightly bound to DNA, which has many phosphate groups. The pI of histones is very high, about 10.8. What amino acid residues must be present in relatively large numbers in histones? In what way do these residues contribute to the strong binding of histones to DNA? (10%)
6. Why is carbon monoxide (CO) toxic to aerobic organisms? Please indicate its target and binding activity. (8%)
7. Chymotrypsin belongs to a group of proteolytic enzymes called the “serine proteases,” many of which have Asp, His, and Ser residue that are crucial to the catalytic mechanism. The serine hydroxyl functions as a nucleophile. What do the other two amino acids do to support this nucleophilic reaction? (8%)
8. Please distinguish nucleosides, nucleotides, nucleic acid, and chromosome. (8%)
9. In glycolysis, there are two reactions that require one ATP each and two reactions that produce one ATP each. This being the case, how fermentation of glucose to lactate can lead to the net production of two ATP molecules per glucose? (Hint: explain why?) (8%)
10. What is “futile cycle”? Please give an example of a potential futile cycle in carbohydrate metabolism. (8%)

## 二、填空題，請用英文作答(14%)

DNA replication in *E.coli* begins at a site in the DNA called the (A). At the replication fork the (B) strand is synthesized continuously while the (C) strand is synthesized discontinuously. On the strand synthesized discontinuously, the short pieces are called (D) fragments. An RNA primer for each of the fragments is synthesized by an enzyme called (E), and this RNA primer is removed after the fragment is synthesized by the enzyme of (F), using its 5'→3' exonuclease activity. The nicks left behind in this process are sealed by the enzyme of (G).