不可攜帶計算機＊

1. 在基因轉譯的時候，mRNA 和 tRNA 會互相配對，請依下圖回答問題
    甲、圖中所顯現的密碼序列是 ＿＿＿＿＿ 。(3%)
    乙、圖中所顯現的反密碼序列是 ＿＿＿＿＿ 。(3%)
    丙、請問在圖中的 tRNA 末端的 A 或 B 方格，才是胺基酸所放的位置。
    ＿＿＿＿＿ (4%)
    丁、按照密碼對應的這個 tRNA 末端胺基酸應該是 ＿＿＿＿＿ 。(4%)
    戊、請解釋什麼是"Wobble" base ? (5%)
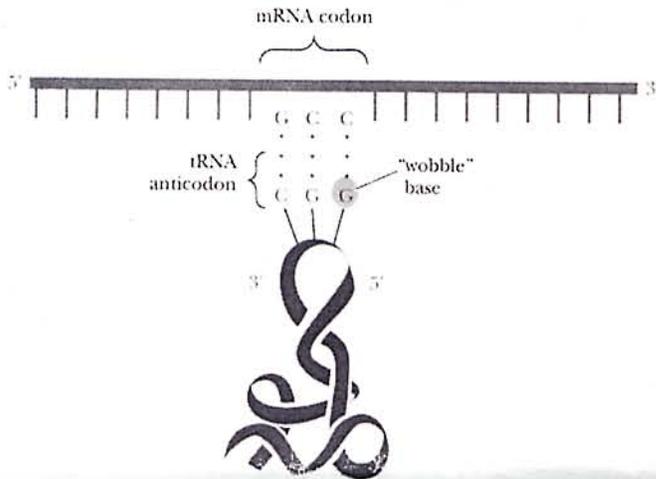
The genetic code

| First Base of Codon	Second Base of Codon				Third Base of Codon
	U	C	A	G	
U	UUU UUC } Phe / UUA UUG } Leu	UCU UCC UCA UCG } Ser	UAU UAC } Tyr / UAA UAG	UGU UGC } Cys / UGA / UGG Trp	U C A G
C	CUU CUC CUA CUG } Leu	CCU CCC CCA CCG } Pro	CAU CAC } His / CAA CAG } Gln	CGU CGC CGA CGG } Arg	U C A G
A	AUU AUC AUA } Ile / AUG Met	ACU ACC ACA ACG } Thr	AAU AAC } Asn / AAA AAG } Lys	AGU AGC } Ser / AGA AGG } Arg	U C A G
G	GUU GUC GUA GUG } Val	GCU GCC GCA GCA } Ala	GAU GAC } Asp / GAA GAG } Glu	GGU GGC GGA GGG } Gly	U C A G

Note: AUG is the start codon and UAA, UAG, and UGA are stop codons as highlighted in table.
Source: Redrawn from Wolfe, 1993.

2. 請問下圖最有可能是在顯示哪種大分子的在細胞的特定位置的代謝？

＊不可攜帶計算機＊

Mitochondria
(Catabolism by β-oxidation,
some chain lengthening)

Endoplasmic reticulum (ER)
(Chain lengthening,
introduction of double bonds)

Nucleus

Cell membrane

Cytosol
(Anabolism, formation
of acyl-CoA)
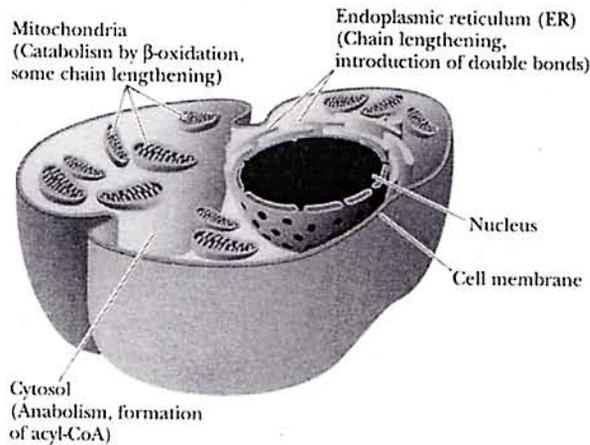
3. 酪氨酸 tyrosine 常以 UAU 和 UAC 為密碼。請問熱泉中的細菌比較可能使用
   哪個密碼來代表酪氨酸 tyrosine？為什麼？(5%)

4. 依下圖說明
   甲、此蛋白質用什麼結構和 DNA 結合？(5%)
   乙、舉出你所認識會結合 **DNA** 的蛋白質名稱？(8%)
   丙、舉出你所認識會結合 **RNA** 的蛋白質名稱？(8%)
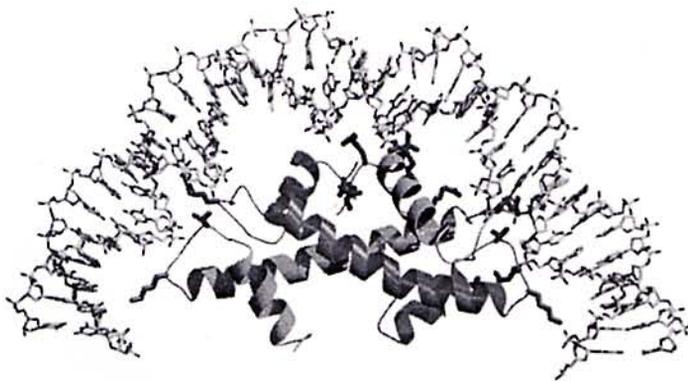
5. An enzyme whose activity is affected by the binding of effector molecules is
   called an: (5%)

(A)Inhibitor (B) Activator (C) isozyme (D) allosteric enzyme

6. Which substance is a product of glycolysis, a precursor of gluconeogenesis and a
   precursor of the citric acid cycle? (5%)

(A)Glucose (B) Coenzyme A (C) Pyruvate (D) ATP

7. A spontaneous chemical reaction always has a _____ change. (5%)

(A) negative Gibb's free energy (B) positive entropy (C) negative entropy (D) positive Gibb's
free energy

不可攜帶計算機＊

8. Define the following terms (10%, 5% for each term).
   (A) Hydrophobic effect; (B) substrate-level phosphorylation

9. Describe briefly the four levels of the structural organization of proteins. (15%)

10. State 3 reasons to show why multisubunit proteins are quite common in living organisms. (10%)