

1-4 為單選題: (每題 5% , 合計 20%)

1. An enzyme whose activity is affected by the binding of effector molecules at sites other than the substrate binding site is called a/an: (A) synthase (B) isozyme (C) allosteric enzyme (D) digestive enzyme
2. A spontaneous chemical reaction always has a _____ change. (A) positive entropy (B) negative Gibb's free energy (C) negative entropy (D) positive Gibb's free energy
3. The pathway which converts 2 molecules of pyruvate to one molecules of glucose at a cost of 6 ATP is : (A) gluconeogenesis ; (B) glycogen synthesis ; (C) glycolysis ; (D) glyoxylate cycle .
4. Sugars that differ only in the configuration around the carbonyl carbon that becomes a chiral center when the sugar cyclizes are (A) isomers ; (B) enantiomer ; (C) monomers ; (D) anomers .
5. Why do we say that DNA replication is semiconservative? (10%)
6. Describe briefly the four levels of the structural organization of proteins. (20%)
7. 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、按照標準遺傳密碼對應表，當 tRNA 含 5'ACU3' 序列在 _____ (請填密碼或反密碼區) 時，此 tRNA 末端胺基酸應該是 _____，這種對應關係主要是由 _____ 酵素來決定的。(6%)

		2nd base in codon				
		U	C	A	G	
1st base in codon	U	Phe Phe Leu Leu	Ser Ser Ser Ser	Tyr Tyr STOP STOP	Cys Cys STOP Trp	U C A G
	C	Leu Leu Leu Leu	Pro Pro Pro Pro	His His Gln Gln	Arg Arg Arg Arg	U C A G
	A	Ile Ile Ile Met	Thr Thr Thr Thr	Asn Asn Lys Lys	Ser Ser Arg Arg	U C A G
	G	Val Val Val Val	Ala Ala Ala Ala	Asp Asp Glu Glu	Gly Gly Gly Gly	U C A G
						3rd base in codon

乙、由於遺傳密碼多對一的情形，就有”Wobble” base 的說法。請解釋什麼是”Wobble” base？(4%)

丙、如下表所示，果蠅粒線體基因在遺傳密碼對應表使用方式與細胞核內基因不盡相同，請畫出並比較果蠅細胞核與粒線體運送 Arg 和 Ser 之 tRNA 的結構簡圖。(6%)

Sense Codon Reassignments in Mitochondria

BIOLOGICAL SYSTEM	GENOME SIZE (kb)	SENSE CODON REASSIGNMENT*				
		UGA Stop	AUA Ile	AGA Arg	AGG Arg	AAA Lys
Animalia:						
Mammals (human)	16	Trp	Met	Stop	Stop	++
Amphibians (<i>Xenopus laevis</i>)	16	Trp	Met	Stop	--	++
Insects (<i>Drosophila yakuba</i>)	16	Trp	Met	Ser	--	++

丁、續丙小題，這種遺傳密碼對應表使用方式的不相同對其轉譯出來的蛋白質會不會有影響？請說明。(4%)

8. 利用下表數據，請盡你所能畫圖並說明一個人類基因結構各種特徵。(16%)

	Median
Internal exon	122 bp
Exon number	7
Introns	1,023 bp
3' UTR	400 bp
5' UTR	240 bp
Coding Sequence (CDS)	1,100 bp 367 aa
Genomic extent	14 kb

9. 試比較 DNA 和 RNA 有那些不同。(4%)

10. 對於生物技術方面，請畫圖並說明 DNA 聚合酶連鎖反應的目的、步驟。(10%)