注意事項：
- a. 請用中文作答
- b. 除特別標註之外，每題文字敘述不可少於 100 字
- c. 必要時可用繪圖表示，但須以文字加以解釋 (文字敘述亦不可少於 100 字)
- d. 一共 10 題，每題 10 分，總分 100 分

1. Please describe how the restriction endonuclease was discovered? What is the role for the restriction enzyme? What is multiple cloning site (MSC)?

2. Please illustrate a map of plasmid and point out gene function or other components on this plasmid. (Ex. Ori, antibiotic gene)

3. Please compare the transcription mechanism difference in between prokaryotes and eukaryotes.

4. Please explain following terms: (每項不得少於 50 字)
   - a. Semidiscontinuous replication
   - b. Priming of DNA synthesis
   - c. Function of Topoisomerase
   - d. How the DNA was caused the damage and how the damaged DNA was repaired?

5. Please describe the procedure of the maturation of mRNA in eukaryote cell? (Your answer should include splicing, capping, and polyadenylation.)

6. Please translate following RNA sequence into an amino acid sequence in reading frame +2 base on the attached table.

   (5'-UAUGUUAAUCAGUGUCAAGAAA-3')

	T	C	A	G
T	TTT Phe F TTC Phe F TTA Leu L TTG Leu L	TCT Ser S TCC Ser S TCA Ser S TCG Ser S	TAT Tyr Y TAC Tyr Y TAA stop * TAG stop *	TGT Cys C TGC Cys C TGA stop * TGG Trp W
C	CTT Leu L CTC Leu L CTA Leu L CTG Leu L	CCT Pro P CCC Pro P CCA Pro P CCG Pro P	CAT His H CAC His H CAA Gln Q CAG Gln Q	CGT Arg R CGC Arg R CGA Arg R CGG Arg R
A	ATT Ile I ATC Ile I ATA Ile I ATG Met M	ACT Thr T ACC Thr T ACA Thr T ACG Thr T	AAT Asn N AAC Asn N AAA Lys K AAG Lys K	AGT Ser S AGC Ser S AGA Arg R AGG Arg R
G	GTT Val V GTC Val V GTA Val V GTG Val V	GCT Ala A GCC Ala A GCA Ala A GCG Ala A	GAT Asp D GAC Asp D GAA Glu E GAG Glu E	GGT Gly G GGC Gly G GGA Gly G GGG Gly G

7. Please explain the following terms: (每項不得少於 50 字)
   - a. Kozak's rules
   - b. Open reading frame (ORF)
   - c. Eukaryotic initiation factor (eIF)
   - d. The translation unit
   - e. Function of Shine-Dalgarno sequence

8. Please describe the mechanism of RNA interference (RNAi).

9. Please explain the following terms: (每項不得少於 50 字)
   - a. Genomics
   - b. Proteomics
   - c. Metabolomics
   - d. Bioinformatics

10. Please give an example about the application of biotechnology.

試題隨卷繳回