國立臺灣海洋大學113學年度碩士班考試入學招生考試試題

考試科目：分子生物學

學系組名稱：食品科學系碩士班生物科技組

1.答案以橫式由左至右書寫在**答案卷**上。2.請依題號順序，並標示題號作答。

Short-answer questions. (50 pts)

1. Please list the main differences in transcriptional regulation between eukaryotes and prokaryotes. (5 pts)
2. Please provide the meaning of positional information, which plays a central role in pattern formation during development. (5 pts)
3. Please explain what CRISPR is, and how E. coli utilizes this system to avoid reinfection by previously encountered viruses. (10 pts)
4. Please draw the structure of nucleotide and label the structures of nucleoside, base, sugar and acid. (10 pts)
5. Please describe the function of DNA methylation and the definition of epigenetics. (10 pts)
6. What is the structure and organization of human genomes. (10 pts)

Assay questions. (50 pts)

1. Describe transcription in prokaryotes, including initiation, elongation, and termination mechanisms. (8 pts)
2. Define wobble base pairs and provide examples. (5 pts)
3. Describe prokaryotic ribosomes in terms of composition and function. (5 pts)
4. Define genetically modified food and provide examples. (5 pts)
5. Describe the principle and procedures of polymerase chain reactions. (5 pts)
6. Describe mRNA A-to-I RNA editing, including its physiological role and catalytic enzyme. (6 pts)
7. Describe the gene-silencing pathway mediated by RNA-induced silencing complexes. (6 pts)
8. Describe nucleosomes in terms of their structure, origin, and biological roles. (6 pts)
9. Define rare codons and explain the codon usage problem in protein expression. (4 pts)