

國立臺灣海洋大學 106學年度研究所碩士班招生考試試題

考試科目：微生物學

系所名稱：食品科學系碩士班生技組

1. 答案以橫式由左至右書寫。2. 請依題號順序作答。

PartA : Please provide appropriate answers for the following 10 questions: (total 50%)

1. Please describe four factors related to the effectiveness of antimicrobial treatments. (8%)
2. What chemical is the most frequently used gas for sterilization? What are the effective concentrations of ethanol against bacteria? (4%)
3. What is the benefit of the degeneracy of the genetic code? (4%)
4. Describe DNA replication, including the functions of DNA gyrase, DNA ligase and DNA polymerase. (8%)
5. Please differentiate cDNA from synthetic DNA. (4%)
6. Please describe the advantages and disadvantages of using *Escherichia coli* for genetic engineering. (6%)
7. Please describe some agricultural applications using *Agrobacterium*. (8%)
8. What is tested in Western blotting and Southern blotting? (4%)
9. Place the following in the most likely order for biosynthesis of a bacteriophage: (a) phage lysozyme; (b) mRNA; (c) DNA; (d) viral proteins; (e) DNA polymerase. (2%)
10. Place the following in the order in which they are found in a host cell: (a) capsid proteins; (b) infective phage particles; (c) phage nucleic acid. (2%)

PartB :

1. Please define and/or explain the following terms: (18%)
 - 1A. Normal microbiota and infectious disease
 - 1B. Total magnification and resolution (light microscope)
 - 1C. Prokaryotes and eukaryotes
 - 1D. Chemotrophs and phototrophs
 - 1E. Psychrotrophs and mesophiles
 - 1F. Heterolactic and homolactic fermentation
2. Please state of what value are capsule, endospores, and flagella to bacteria. (6%)
3. Please describe the similarity and difference among (A) oxidative phosphorylation, (B) photophosphorylation, and (C) substrate-level phosphorylation. (6%)

4. Please calculate the aerobic plate count of the sample X, after surface spread plating the colonies counted on the PCA agar plates of these 4 series diluted solutions are as following: (The correct answer and calculating procedure are both required for the full scores of this question!) (8%)

10^{-4}	10^{-5}	10^{-6}	10^{-7}
TNTC	336	56	11
TNTC	458	84	15

5. Please explain simple diffusion, facilitated diffusion, active transport, and group translocation (6%)
6. Please compare the similarities and differences among simple, special, and differential stains. (6%)