

國立臺灣海洋大學114學年度碩士班考試入學招生考試試題

考試科目：微生物學

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。

第一部分: (共五十分)

I. Choose one appropriate answer for each of the following questions (2% each, total 20%)

1. Which of the following cannot be autoclaved?  
a) Glass    b) Sodium chloride solution  
c) Pipette tips    d) Vaccines
2. Food are preserved with all of the following except  
a) Sodium nitrate.    b) Sodium propionate.  
c) Potassium sorbate.    d) Bisphenols.
3. Which of the following statement is false?  
a) DNA polymerase joins nucleotides in one direction only.  
b) The leading strand of DNA is made continuously.  
c) The lagging strand of DNA is started by a DNA primer.  
d) DNA replication proceeds in two directions around the bacterial chromosome.
4. The value of cDNA in recombinant DNA is that  
a) It lacks exons.    b) It lacks introns.  
c) It's really RNA.    d) None of the above.
5. Which of the organism naturally possesses the Ti?  
a) *Thermus aquaticus*    b) *Agrobacterium tumefaciens*  
c) *Saccharomyces cerevisiae*    d) *Bacillus thuringiensis*
6. If two organisms have similar rRNA sequences, you can conclude that  
a) They live in the same place.  
b) They evolved from a common ancestor.  
c) They will have different G-C ratios.  
d) They will both ferment lactose.
7. A species can best be defined as  
a) A taxon composed of families.  
b) A taxon belonging to a genus.  
c) A taxon comprised of classes.  
d) The most specific taxon.
8. Latent viruses are present in cells as  
a) Capsids.    b) Enzymes.    c) Proviruses.    d) None of the above.
9. Which of the following is most likely to be bactericidal?  
a) Membrane filtration    b) Ionizing radiation    c) Lyophilization  
d) Deep-freezing

10. The DNA probe, 3'-GGCTTA, will hybridize with which of the following?

- a) 5'-CCGUUA    b) 5'-GGCTTA    c) 3'-CCGAAT    d) 5'-CCGAAT

**II. Please provide short answers for the following questions: (total 30%)**

1. What are the roles of promoter, terminator, and mRNA in transcription? (6%)
2. How does lysogenic cycle of phage differ from its lytic cycle? (6%)
3. PCR is a useful method for carrying out DNA recombination. What is PCR? Try to point out the meanings or effects of each individual temperature. (8%)
4. Please describe five different ways to insert the heterogeneous DNA into cells. (10%)

**第二部分: Short Answer Questions (共五十分)**

1. Please define microorganisms and describe the characteristics of different types of microorganisms (15%).
2. Please outline the steps involved in the Gram staining procedure and explain its underlying principle (5%).
3. Please differentiate between homofermentative and heterofermentative lactic acid fermentation (5%).
4. Please list the essential factors required for bacterial growth (5%).
5. Please describe the methods used to measure bacterial growth (5%).
6. Please compare chemically defined media and complex media, highlighting their differences (5%).
7. What are the purposes of using selective media and differential media in microbiology? (5%).
8. Please describe the phases of the bacterial growth curve (5%).