

國立臺灣海洋大學 101 學年度研究所碩士班暨碩士在職專班入學考試試題

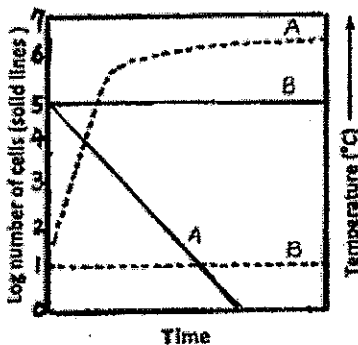
考試科目：微生物學

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。

1. Please define and/or explain the following terms: (20%)
 - 1A. Transformation and electroporation
 - 1B. Extremophiles
 - 1C. Shuttle vectors and Ti-plasmid
 - 1D. Culture, clone, and strain
 - 1E. Mutagen and missense mutation
 - 1F. Primary metabolites and secondary metabolites
 - 1G. Conjugative plasmid and dissimilation plasmid
 - 1H. *Saccharomyces cerevisiae*
 - 1I. *Helicobacter pylori* infection
 - 1J. Operon
2. Please describe the major modes of action of antimicrobial drugs. (8%)
3. Please define "Aseptic Techniques", and its uses in hospitals and microbiological laboratory. (8%)
4. Please explain what is "Koch's Postulates" and what is "Exceptions to Koch's Postulates", also please state the cause of the latter. (8%)
5. Please state how antibiotic-resistance genes, DNA probes, and gene products may used separately to locate a clone, which may carried an interested gene . (6%)

6. Two samples (A, B) of *Escherichia coli* cells with the number of 10^5 cells were prepared to determine the lethal action of microwave. One sample was exposed to microwave radiation while wet, whereas the other was lyophilized and then exposed to radiation. The results are shown in the following figure. Dashed lines indicate the temperature of the sample. Please indicate the status of being wet or lyophilized for samples A and B, and explain the reasons for your answer. In addition, please explain the most likely lethal action for microwave radiation (Be noticed that no point will be given if you do not give your reasons and explanation). (10%).



7. *E. coli* was incubated at 37°C with aeration in a nutrient medium containing two carbon sources of glucose and lactose. Please draw the growth curve obtained for *E. coli* and explain the meaning of this growth curve. (10%)
8. Please describe two different methods for bacteria to transport the substance across the plasma membrane with the use of the metabolic energy input. (10%)
9. Compare and contrast: (5% each)
- pasteurization vs. sterilization
 - defined medium vs. complex medium
 - respiration vs. fermentation
 - cell wall structure between G(+) and G(-) bacteria