

國立臺灣海洋大學九十九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 or explain the following terms: (15%)
  - 1A. Base pairs and genomes
  - 1B. Exotoxins and endotoxins
  - 1C. Hybridization and colony hybridization
  - 1D. Innate immunity and adaptive immunity
  - 1E. Plaques formed by bacteriophages
2. Please describe the principle behind the Ames test? And why is it necessary for some mutagens to be identified with the rat liver (S-9) extract? (10%)
3. Please explain how each of the following is used to locate a clone: (9%)
  - 3A. Transcribed (and matured) mRNA,
  - 3B. DNA probes,
  - 3C. Gene end products
4. Please state how can a bacterium called *Helicobacter pylori* live in host stomach and cause "peptic ulcer disease". (8%)
5. Please briefly compare the positive and negative (repression and induction) regulation of *lac* operon performance. (8%)
6. 比較說明 (A) acid-fast stain and endospore stain 之操作與目地; (B) cell wall structures of Gram positive bacteria and Gram negative bacteria; (C) anaerobic phosphorylation and aerobic phosphorylation; (D) group translocation and facilitated diffusion. (每小題各 5 分)
7. 接種 *Escherichia coli* 於 glucose 為唯一碳源之培養液中，使起始菌濃度為  $10^3$  cfu/mL，於  $37^\circ\text{C}$  分別進行有氧培養與厭氧培養，當此二種培養所得菌數均達到  $10^7$  cfu/mL 時，此二種狀態培養之培養液中殘留 glucose 量何者較多？請以代謝能量觀點詳細說明其原因。(10 分)
8. 你如何自土壤中篩選能分解 chitin 的純種細菌？請寫出你的詳細操作，並解釋說明之。(10 分)
9. 何謂 D value (2 分)？並請敘述說明你如何經由實驗獲得 *E. coli* 在  $60^\circ\text{C}$  之 D value。(8 分)