

# 國立中央大學八十九學年度碩士班研究生入學試題卷

所別： 生命科學系 不分組 科目： 微生物學 共 / 頁 第 / 頁

## I. 是非題 (答案紙上請註明題號，答案為“是”者不必解釋，答案為“非”者請更正之，每題 3 分)

1. Microbiologists study a variety of organisms, but all are considered members of the kingdom Monera.
2. Immersion oil is used with 100x objective lens in order to increase the amount of light passing through a specimen.
3. The rotation of bacterial flagella is powered by ATP hydrolysis.
4. The Gram-negative bacteria, the space between the cell wall and the plasma membrane contains many proteins that participate in nutrient acquisition.
5. The size and shape of a colony is not useful for identification of a microorganism because most microorganisms produce colonies that are indistinguishable from one another.
6. Electron transport reactions similar to those that occur in the mitochondria of eucaryotes also occur in procaryotes but take place on the plasma membrane in the latter cells.
7. When a young, vigorously growing culture of bacteria is transferred to fresh medium of different composition, the lag phase is usually short or absent.
8. Transformation has been observed in only a limited number of species in nature, but we have found ways to force the process upon other species in the laboratory.
9. Because peptidoglycan lies outside the plasma membrane, all steps in the complex synthesis process of this molecule takes place outside the cell.
10. A plaque assay is most useful in determining the viability of a viral preparation.
11. Prions are a proteinaceous particle with no apparent nucleic acid genome.
12. The termination of lysogeny and entry into the lytic cycle usually occurs in response to environmental damage to the host DNA.
13. Although there are other classification schemes, the one used in Bergey's Manual is currently the standard.
14. Rapid microbial identification systems such as BIOLOG identify bacteria based on fermentation characteristics.
15. Members of the genus *Lactobacillus* are normal floras of mouth, intestinal tract and vagina.
16. *Bifidobacterium bifidus* is a major pathogen in breast-fed babies.

## II. 問答題：

1. Please describe the physiological properties (growth habitat, energy and carbon source, special metabolic and biochemical characteristics etc.) of the following microorganisms: (每小題 5 分)
  - 1) chemoorganotrophs
  - 2) nitrifying bacteria
  - 3) sulfate reducing bacteria
  - 4) halophiles
  - 5) cyanobacteria
  - 6) methylotrophs
  - 7) extreme thermophiles
2. What is microbial diversity? Please design experiments to study the microbial community structure in a soil sample? (10 分)
3. Please give two examples of green house gas. (3 分) Explain how microorganism(s) can be applied in the decreasing of green house effect (4 分).