

# 國立中山大學九十一學年度博士班招生考試試題

科目：生物學【海生所】

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1. Nutrients are important elements for plant and animal development. (25%)
  - (1). Definition: define "nutrient"
  - (2). Definition: define "storage nutrient"
  - (3). Methodology: show the methods in the determination of limited nutrients in plants and animals, respectively.
  - (4). Nutrient limitation: figure out the physiological responses of plants and animals to nutrient deficiency.
  - (5). Eutrophication: show the causal factors resulting in eutrophication.
  - (6). Regulation: It is known the requirement of energy for nutrient uptake by plants. Which kind of energy? (Please detail the relationship of energy to nutrient uptake.) How to prove the requirement of energy in nutrient uptake?
  - (7). Nutrient cycle: show the case of N.
  
2. Describe the possible neuronal mechanisms associated with learning and memory. (25%)
  
3. Pneumococci invade an organism and cause pneumonia when an organism is unable to contain the invasion. Please describe how the immune system of the organism, for example that of a human body, attacks Pneumococci. (25%)
  
4. List the reactants, enzymes and organelles involved in replication, transcription and translation, respectively. (25%)