

# 國立中山大學95學年度博士班招生考試試題

科目：生物科學【生科系】

共 / 頁 第 / 頁

問答題：每位考生必須回答規定的五題問題，每題 20 分；

甲組考生--必須回答 1 至 4 題，外加其餘題目中之任何一題(其餘題目作答超過一題者，以得分最低的一題計算成績)

乙組考生--必須回答 5 至 8 題，外加其餘題目中之任何一題(其餘題目作答超過一題者，以得分最低的一題計算成績)

丙組考生--必須回答 9 至 12 題，外加其餘題目中之任何一題(其餘題目作答超過一題者，以得分最低的一題計算成績)

1. Barry J. Marshall and J. Robin Warren are the Nobel Prize winners of 2005 for their discovery of the bacterium *Helicobacter pylori*. Describe the scientific significance of their findings as much as you know.
2. Describe the ingredients of extracellular matrix (ECM) of animal cells and their particular roles in cell migration.
3. How does the immune system perform self-versus-nonself recognition? How is tolerance to self antigens achieved? What might cause an immune attack of self antigens? Discuss the use of bone marrow transplantation for the treatment of autoimmune diseases and effects of the treatment on autoimmunity.
4. Explain how mollusks could be involved in human health in at least three different aspects. Cone snails produce a toxin that blocks voltage-gated calcium channels. Which of the two types of synapses would be most affected by the toxin? Why? How is it possible for a given neurotransmitter to produce opposite effects in different tissues?
5. Term explanation:  
(1). Reverse transcriptase (2). Photorespiration (3). Apical dominance (4). Transposon (5). Polymerase chain reaction (PCR)
6. Describe (a) using the Ti plasmid as a vector for genetically engineering plants or (b) one type of gene therapy procedure.
7. Describe four levels of protein structure.
8. Describe one of the signaling mechanisms of animal or plant hormones as you know.
9. Biological species concept is based on reproductive isolation. Please describe known reproductive isolation.
10. Please describe the relationships between climate and terrestrial biomes.
11. How to measure biological diversity?
12. Discuss the mechanisms of ecological succession.