

國立中山大學96學年度博士班招生考試試題

科目：生物學 【海生所選考】

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九十六學年度海生所博士班招生考試

生物學

問答題 (100%) (每題 5 分)

請在答案卷內簡單回答下面所有問題。每題回答約在二行左右。提供最可能及適切之答案，混雜有錯誤答案時會酌予扣分。可使用中英文回答。

1. Draw a water molecule, is it a polar or nonpolar molecule? Why?
2. Why is the climate of land near large bodies of water warmer in the winter and cooler in the summer than the climate of areas far from water?
3. What are the main difference between inorganic and organic molecules?
4. The Second Law of Thermodynamics states any system naturally tend to increase its entropy---to become less ordered. It has been said that life violates this Law. What observations led to such statement, and why is the statement untrue?
5. Explain the major function of mitochondria
6. Why is heat used to sterize nonliving objects?
7. Why is it that animal cells do not have cell walls?
8. If you place an animal cell in pure water, what will happen next?
9. What is the longest cell within the human body? Why?
10. what are the two major causes for mutation to occure during reproduction?
11. What is the major difference between passive and active transport across a membrane?
12. What is the relation between body temperature and metabolic rate? Explain why our body temperature rise when we excercise.
13. What are the contributions of bacteriophage to human society?
14. Why are there 64 different codons for 20 different amino acids?
15. What are the advantages and disadvantages of sexual reproduction?
16. Name four groups (class) of vertebrates where sex-determination system in which males are X/Y and females are X/X is not found.
17. Why is Lamarck' s theory of evolution rejected by most biologists?
18. Give an example to explain the theory of sexual selection by Charles Darwin.
19. Please give, as thorough as possible, a list of the major Phylum of either the animal or the plant world (either in chinese or in english).
20. Please give the general major characteristics of living organisms.

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Choose and answer 2 questions (50% each) from the following. Please list the keywords in the beginning of each answer.

1. Climate change has been an eye-catching issue in the media and the science communities. Please describe the role of the ocean in climate change and the importance of marine organisms in affecting the biogeochemical processes of marine ecosystems in the context of climate change. Please list 5 (five) keywords you use in answering the question.
2. Zonation is one phenomenon frequently observed in rocky shores and salt marshes. Describe the phenomena and compare the physical and biological factors that cause zonation in the two environments. Please list 3 (three) keywords you use in answering the question.
3. Describe the role of Kuroshio Current (黑潮) in shaping the marine environment around Taiwan and the distribution of marine organisms. You are encouraged to use single species or group of organisms you are familiar with as the example in answering the question. Please list 5 (five) keywords you use in answering the question.
4. Give 3 (three) sound examples showing how biotechnology concepts and techniques are applied on the study of marine biology. Please list 3 (five) keywords you use in answering the question.