

國立中山大學八十九學年度碩博士班招生考試試題

科目：普通生物學 海洋生物研究所碩士班 共 3 頁 第 1 頁

I. Fill-in questions. (in English or Chinese) (70%). 每題 2 分

1. Organisms that lack a nuclear membrane and membrane-bound organelles are \_\_\_\_\_.
2. Protein synthesized in the rough endoplasmic reticulum is transported in little packets to the \_\_\_\_\_, where it is concentrated and repackaged for secretion from the cell.
3. Connections between cells in which the two membranes actually fuse and the intercellular space disappears are termed \_\_\_\_\_.
4. A substance that affects the rate of a chemical reaction without affecting its equilibrium point is a \_\_\_\_\_.
5. Blue light has \_\_\_\_\_ energy than red light.
6. Production of alcohol from sugar is an example of \_\_\_\_\_.
7. Cells containing more than two complete sets of chromosomes are termed \_\_\_\_\_.
8. DNA synthesis is catalyzed by the enzyme \_\_\_\_\_.
9. Small accessory double-helical chromosomes called \_\_\_\_\_ occur in many bacteria.
10. \_\_\_\_\_ are proteins produced by host cells that interfere with viral replication.
11. Red tide is caused by \_\_\_\_\_.
12. Ecologically, fungi serve as \_\_\_\_\_.
13. In protostomes the blastopore develops into the \_\_\_\_\_.
14. A true coelom is completely lined with \_\_\_\_\_.
15. A hemocoel is characteristic of animals with an \_\_\_\_\_ circulatory system.
16. The turgor pressure within the guard cells changes in response to an influx of \_\_\_\_\_ into these cells.
17. The basic ecological and physiological function of seasonal leaf loss appears to be that of \_\_\_\_\_ conservation.
18. \_\_\_\_\_ stimulate stem growth and mediate germination in seeds.
19. Since an exoskeleton tends to limit size, arthropods must \_\_\_\_\_ from time to time in order to grow.
20. The rhythmic waves of contraction that move food through the digestive tract are referred to as \_\_\_\_\_.
21. Ketone bodies are produced during the metabolism of \_\_\_\_\_.
22. Hemocyanin is a pigment that transports \_\_\_\_\_.
23. A deficiency in hemoglobin is referred to as \_\_\_\_\_.
24. Prothrombin requires vitamin \_\_\_\_\_ for its production.

25. Baroreceptors are sensitive to changes in \_\_\_\_\_.
26. In a typical allergic reaction mast cells secrete \_\_\_\_\_ and other compounds that cause inflammation.
27. Most carbon dioxide is transported in the blood as \_\_\_\_\_.
28. Functional connections between neurons are called \_\_\_\_\_.
29. The neurotransmitter that stimulates muscle contraction is \_\_\_\_\_.
30. Sensory nerves enter the spinal cord through the \_\_\_\_\_ root.
31. Estuaries are noted for their low salinity and \_\_\_\_\_ biological productivity.
32. Neurosecretory cells are neurons that secrete \_\_\_\_\_.
33. Changes that result in decreased functional capacities of the organism are characteristic of the process of \_\_\_\_\_.
34. The process of \_\_\_\_\_ provides the genetic variability that is the raw material of evolution.
35. \_\_\_\_\_ are chemical signals that convey information between members of a species.

III. Assay questions. (30%) 每題十分

1. What are the possible effects of changes in biodiversity on marine ecosystem ?

2. Predict the distribution and speciation of sea slugs *Haminaea vesicula* and *Haminaea callidegenita* collected at the Spencer's Spit lagoon, Lopez Island, Washington. Summary of the life history characteristics is as follows.

	<i>H. vesicula</i>	<i>H. callidegenita</i>
Larval type	planktotrophic	lecithotrophic
Egg diameter (um)	90	230
Embryonic period duration (day)	9 to 12	32 to 39
shell length at hatching (um)	123±12	360±16
Pelagic period duration (day)	30 to 34	0 to 20
shell length at metamorphosis (um)	180±11	360±16
Juveniles growth rate (mm.d-1)	0.048±0.012	0.033±0.018
size at maturity (mm)	15	13

3. What do you learn from the following sponge experiment ?

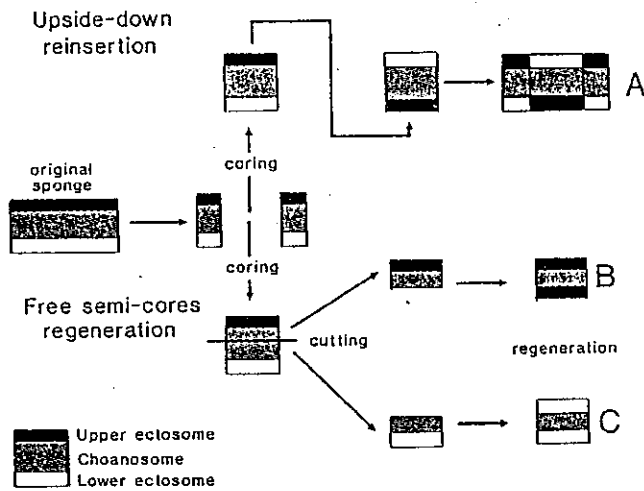


Figure 1. Scheme of coring experiments in *Chondrosia reniformis*. (A) Showing that differences in the mineral selectivity of the upper and lower sides of the ectosome are related to their histology. Cores (about 5–6 cm<sup>2</sup>) were cut from the upper to the lower surface and reinserted upside-down in the hole. The central portion of the resulting reconstituted sponges thus had an upper-lower orientation that was reversed. (B, C) Determining whether isolated upper and lower ectosomes can reconstitute an entire animal. Cores were produced and cut transversely to make half-cores. After 2 weeks' regeneration, the upper and lower ectosomes proliferated, enveloping the half-cores.

國立中山大學八十九學年度碩博士班招生考試試題

科目：(選考) 動物生理學 海洋生物研究所碩士班 共 / 頁

壹、解釋下列名詞之生理意義或功能 (每題 3 分)

1. basal metabolic rate
2. end-plate inhibition
3. voltage-sensitive ion channel
4. excitatory postsynaptic potential
5. lateral inhibition
6. LH surge
7. hypothalamo-pituitary portal vessels
8. alternate complement pathway
9. glomerular filtration
10. sliding filament mechanism

貳、問答題 (每題 7 分)

1. Describe the characteristics of protein binding sites.
2. Diagram the changes in membrane permeability to  $\text{Na}^+$  and  $\text{K}^+$  that occur with the membrane potential changes during the action potential.
3. What are the differences between electric and chemical synapse.
4. What are the factors that determine the plasma concentration of hormones.
5. Describe the role of hormone receptors in hormone action.
6. What are the functions of ATP in muscular activity.
7. Identify the two major hydrogen-ion buffers found in urine and describe how these buffers work.
8. Name the ovarian hormones, state their chemical nature and site of origin.
9. What is the difference between specific and nonspecific immune responses.
10. List the five classes of immunoglobulins and the general functions of each class.

國立中山大學八十九學年度碩博士班招生考試試題

科目：(選考) 普通植物學 海洋生物研究所碩士班 共 1 頁

I. Explain the following terms. (30%) 每題3分

1. chloroplast
2. photosynthetic electron transport
3. Krebs cycle
4. phytochrome
5. algae
6. Eumycophyta
7. Tracheophyte
8. Mendel heredity
9. transgenic plant
10. global greenhouse effect

II. Assay questions (70%) 每題10分

1. Describe the importance of  $H_2O$  in plant life.
2. Life cycle of seed plant and *Porphyra* spp. (a red macrophyta).
3. Show the factors affecting the plant distribution on earth.
4. How to measure growth rate in plants.
5. Illustrate the vascular bundle.
6. Show the functions of roots.
7. Explain the "biodiversity" and "sustainable development".

# 國立中山大學八十九學年度碩博士班招生考試試題

科目：(選考) 生態學 海洋生物研究所碩士班 共 1 頁

## A. 解釋名詞 (40%) (每小題 5 分)

- i. 生物群落(biotic community)
- j. 生物圈(biosphere)
- k. K-選擇(K-selection)
- l. 生態系統(Ecosystem)
- m. 生物多樣性(biodiversity)
- n. 微型(小)生態環境(Microhabitat)
- o. 光補償點(Compensation point)
- p. 聖嬰流(El Nino)

## B. 問答題 (每題 20%)

1. 請說明所謂邏輯曲線(logistic curve)方程式的來源和在生態學上之意義。
2. 何謂演替(Succession)?請舉例說明之。
3. 何謂生物族群? 請列舉鑑別生物族群的各種方法。

# 國立中山大學八十九學年度碩博士班招生考試試題

科目：(選考) 水產生物學 海洋生物研究所碩士班 共 / 頁

1. 海洋中湧升流區為高生產力海域，其漁產量也特別高。請問除基礎生產力外，可以導致漁產量高的原因為何？(20%)
2. 請說明台灣海峽迴游性烏魚的迴游現象及其與海洋環境(主要是物理因子) 或氣候變動的關係。近來年漁獲情形如何？影響漁獲的可能因素為何？(20%)
3. 氣候變遷如何影響漁業？請以 El Nino 的現象及你所知道任何一種漁業為例，加以說明(20%)
4. 如何利用衛星遙測資料中的表面水溫及表面水色資料來增進漁獲效率？特別是大洋性迴游魚類。(10%)
5. 虱目魚自一歲起在養殖環境下年自然死亡率為 15%，若現在池中有一歲魚 5000 尾，在不加以間獲情形下，兩年半後魚群數目有多少？(10%)
6. 解釋下列名詞 (20%):
  - 6a. CPUE
  - 6b. Trophic efficiency
  - 6c. Kuroshio Current
  - 6d. Calanus
  - 6e. Recruitment