

東海大學 101 學年度碩士班招生入學考試試題

考試科目：生態學

應考系所：生科系生態組

本試題共4頁：第1頁 (如有缺損或印刷不清者，應即舉手請監試人員處理)

(I) 名詞解釋 (每題 3 分)

- A. geographic range and distribution
- B. metapopulation and local population
- C. dispersal and dispersion
- D. cohort life table and time-specific table
- E. demographic stochasticity and environmental stochasticity
- F. Allee effect and self-thinning
- G. density dependence and density independence
- H. home range and territory
- I. source population and sink population
- J. fundamental niche and realized niche
- K. functional response and numerical response

(II) 選擇題 (單選題，每題3分)

1. 從冰箱拿出一杯可樂放在教室的桌上，不久你會摸到杯外濕濕的，有時會有水珠，請問何種情形下，杯外的水珠會最多
 - A. 若教室是 30 度 C 時，相對濕度 90% 時
 - B. 若教室是 15 度 C 時，相對濕度 50% 時
 - C. 若教室是 30 度 C，相對濕度 50% 時
 - D. 若教室是 25 度 C 時，相對濕度 90% 時
2. 某種魚夏天及冬天生活環境分別為 20 及 10 C。某一研究者在某一夏天，測量此魚類在 10、15、20 C 的游泳速度分別為 1、3、5 cm/second。若此魚展現 complete physiological compensation，其冬天的游泳速度最可能是
 - A. 1 cm / second
 - B. 3 cm / second
 - C. 5 cm / second
 - D. 7 cm / second
3. 某個物體(長 10 cm, 寬 10 cm 及高 10 cm)的 surface-volume ratio _____。
 - A. 0.4
 - B. 0.6
 - C. 0.8
 - D. 1.67

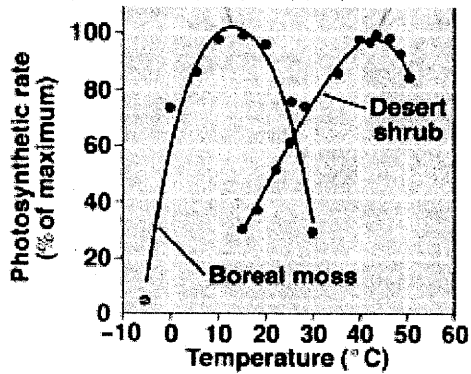
4. 下列何者敘述是錯誤的?

- A. most plants and algae are C3 plants
- B. in C4 plants, acid produced during carbon fixation diffuse to specialized cells surrounding bundle sheath.
- C. in CAM plants, carbon fixation take place at night
- D. in CAM plants, carbon fixation take place in bundle sheath cells

5. Freshwater fish live in a medium that has lower salt concentration than their bodies. To maintain homeostasis, fishes need to

- A. use salt gland to absorbed water
- B. eliminate excess salts acquired through drinking water
- C. use metabolic water to reduce water loss
- D. eliminate excess water absorbed from the surrounding medium

6. 由下列的圖表可以看出：



- A. 不論生長在何種溫度下，酵素的活性都是一樣的
- B. 生長在沙漠中的植物，光合作用的最佳溫度較高
- C. 溫度愈高，光合作用的速率愈快
- D. 在不同溫度下生長的植物，其光合酵素反應的最佳溫度相同

7. 由於氣流的流動形成了各種的氣候, 景觀及 biomes, 請問為什麼沙漠大都位在地球南北緯 23 度上?

- A. 因為此處的陽光直射時間最長
- B. 因為此處受到下沉的乾空氣的影響
- C. 因為此處常年處於高溫的影響
- D. 因為此處是地形風最盛行的區域

8. Poikilotherms exploit microclimates to regulate temperature is called

- A. hibernation physiological
- B. physiological compensation
- C. behavioral thermoregulation
- D. thermoneutral zone

9. 下列敘述何者是對的?

- A. thermoneutral zone (TNZ) is a range of environmental temperature within which the metabolic rates are maximum
- B. outside TNZ, marked by upper and lower critical temperature, metabolic rate decreases
- C. when insulation fails, ectotherms start to shivering (thermogenesis)
- D. Ectotherms have lower TNZ

10. Poikilotherms

- A. are endotherms
- B. can regulate their internal body temperature by increasing metabolic rate.
- C. include mammals and birds.
- D. have body temperatures that vary as environmental temperatures vary.

11. Terrestrial animals satisfy their water needs via eating, drinking, and

- A. basking
- B. hibernation
- C. metabolism
- D. torpor

(III) · 問答題 (第1-2題各11分，第3題12分)

1. In evaluating the species diversity of a region into different components, ecologists often use Alpha, Beta, and Gamma diversity indices. What are the differences between the three diversity indices? What is the defined mathematical relationship between the three diversity indices? Which of the three is so-called “species turnover”?
2. Invasion of introduced species has become one of the most pressing ecological issues throughout the world. It is often found, at least in smaller spatial scales, that increased native species richness reduces the number of invasive plant species. Please discuss the underlying mechanisms enabling plant communities of higher diversity more resistance to invasion.
3. The trophic dynamics of an ecosystem can be summarized using a pyramid of biomass (see figure below). In a terrestrial ecosystem, greater biomass is often found at lower trophic levels; however, aquatic ecosystems have less biomass for primary producers than for higher trophic levels, leading to “inverted biomass pyramid”. How is it possible for primary producers of lower biomass to support greater biomass of higher trophic levels in aquatic ecosystems?

