*請按順序作答

I. Multiple choice (Only one correct answer for each question, 2 points per correct answer) (選擇題：每題僅一個正確答案)

1. Which of the following statements does NOT apply to tropical forest edges?
A. Trees grow more rapidly and survive better in edge habitat than in the forest interior.
B. Edge habitat is drier than the forest interior.
C. Edge habitat has higher solar radiation than the forest interior.
D. Edge habitat is hotter than the forest interior.
E. Forest fragmentation increases the ratio of edge habitat to forest interior.

2. Ferns often maintain high diversity even on very isolated islands, because
A. ferns are often planted deliberately by human colonists.
B. ferns are often introduced accidentally by human colonists.
C. ferns are easily dispersed by light wind-blown spores.
D. ferns are easily dispersed because birds carry their seeds.
E. new fern species most often evolve on isolated islands.

3. Which of the following is not a hypothesis proposed by ecologists to explain an increase in species richness from the poles to the tropics?
A. insufficient time since perturbation in the temperate regions over the tropics
B. lower productivity in the temperate regions over the tropics
C. increased environmental homogeneity in the temperate regions over the tropics
D. increased harsh environments in temperate regions over the tropics
E. increased speciation rates and decreased extinction rates in the temperate regions over the tropics

4. Leibig's "Law of the Minimum" stated that
A. the lowest primary productivity occurs in the coldest ecosystems.
B. primary productivity is typically controlled entirely by climate.
C. primary productivity is typically controlled by both climate and soil nutrients.
D. a single soil nutrient typically limits primary productivity.
E. the highest primary productivity occurs at the coldest ecosystem.

5. The "trophic cascade hypothesis" emphasizes the role of
A. nutrients in controlling primary productivity.
B. nutrients in controlling species diversity.
C. consumers in controlling primary productivity.
D. consumers in controlling species diversity.
E. primary productivity in controlling species diversity.

6. How are C_4 plants and CAM plants similar?
A. They both open their stomata at night.
B. They both initially fix carbon into a four carbon molecule.
C. They both use more water to fix carbon into an organic compound than C_3 plants.
D. They both have bundle sheath cells.
E. Both carbon fixation and PGA production occurs in mesophyll cells

7. In most ecological communities, we find
A. more rare species than moderately common or very common ones.
B. more very common species than moderately common or rare ones
C. more very common species or rare species than moderately common species.
D. more moderately common species than rare or very common ones.
E. roughly equal proportions of rare, moderately common, and very common species

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8. "Self-thinning" in plants refers to reduction in
A. the biomass of an individual in response to competition.
B. the total biomass of a population in response to competition.
C. population density in response to competition, as population biomass increases.
D. population density due to grazing by herbivores.
E. both population density and population biomass in response to competition

9. Based on the Lotka-Volterra competition model, two competitors can coexist only when
A. interspecific competition is stronger than intraspecific competition.
B. intraspecific competition is stronger than interspecific competition.
C. intraspecific and interspecific competition are equally strong.
D. predation or parasitism is stronger than interspecific competition.
E. predation or parasitism is stronger than intraspecific competition.

10. Which of the following statements regarding 'mean generation time' is false?
A. It is generally calculated only for the females in a population.
B. It is the average time from offspring to offspring.
C. It can be calculated using a fecundity schedule and life table.
D. It can be used to calculate the geometric growth rate.
E. It can be used to calculate the per capita rate of increase.

II. Figure drawing (6 points each) (繪圖題)

Please draw a figure or a set of figures to illustrate each of the following ecological concept, and make sure that everything in the figures is properly labeled, including the x- and y-axes (針對下列五個生態學概念，分別畫出一個或一組圖予以說明，圖的內容應有適當標示，包括縱軸和橫軸):

(1) 3 types of functional response
(2) 3 types of survivorship curve
(3) Keystone species
(4) Intermediate disturbance hypothesis
(5) The equilibrium model of island biogeography

III. 簡答題

1. According to optimal foraging theory, under what conditions should a predator add a new prey species to its diet? (5 points)
2. Why can we be sure that all animal and plant populations are under some form of environmental control? (5 points)
3. The competitive exclusion principle states that two species cannot occupy the same niche indefinitely. What is a fundamental assumption of this principle? (5 points)
4. Why, compared to native predators, might exotic predators have a greater impact on native prey population? (5 points)
5. How might human-induced alterations to the global nitrogen cycle affect terrestrial ecosystems? (6 points)
6. How may a species respond to climate change? (8 points)
7. Explain why decomposition rates are higher in some ecosystems than in others, and the functional role of decomposers in an ecosystem. (8 points)
8. Explain why the geographic distribution of terrestrial biomes corresponds closely to variation in climate, especially prevailing temperature and precipitation? (8 points)

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