

I. Explain the following terms (each 6%)

1. Facilitation hypothesis vs. Inhibition hypothesis
2. Batesian mimicry vs. Müllerian mimicry
3. Primary succession vs. Secondary succession
4. Fundamental niche vs. Realized niche
5. Iteroparity vs. semelparity

II. Short essay (each 10%)

1. Discuss the equilibrium model of island biogeography proposed by R. MacArthur and E. O. Wilson, and what was the major question that they tried to address?
2. Define l_x , m_x , R_0 in a life table and explain their relationship.
3. Define three types of diversity that can be measured in a community to express the level of biodiversity

III. Long essay

1. You observe a species of butterflies only occur in some fields in Tainan County, not in all fields, even though it appears that they could fly to any of these fields. State two plausible ecological hypotheses that could explain this pattern of distribution. Briefly state how you can test these hypotheses so that the possible results would support one hypothesis but not the other. (12%)
2. Define functional and numerical responses of predators, and explain how these two functions of predator can result in situations in which predators limit prey population size and situations in which predators do not limit prey population size. (12%)
3. Discuss the potential ecological impact of climate change at the levels of population, community and ecosystem. (16%)