

請按順序作答

1. Research has found that rabies virus were in ferret-badger (*Melogale moschata*) population for more than 50 years in Taiwan. Governmental agencies are determined and coordinated to develop a control program on ferret-badger to prevent rabies outbreak. From an ecological point-of-view and given our current understanding on the species in Taiwan, what ecological information on ferret-badger we need to study to help the design of this control program? (15%)
2. Global biodiversity is threatened by land use change and by the reductions in habitat area and fragmentation that accompany land use change. Researchers suggested that land use change might be the greatest threat to biodiversity. What role do studies of diversity on islands, e.g., Taiwan, and species-area relationships, such as those after the equilibrium model of island biogeography, play in these predictions? (15%)
3. Explain the cause of climate change based on your knowledge on nutrient cycles. In recent years, the governments of most countries of the world have been working hard to develop international agreements, such as the Paris Agreement in 2016, to regulate CO<sub>2</sub> emissions. How might rapid changes in global temperature affect the changes in ecological status? (20%)
4. 植物行光合作用以獲得能量和碳素，請說明：
  - (1)陸生植物所使用的三種主要的光合作用途徑，三種光合作用途徑有何不同。(6分)
  - (2)列舉使用這三種光合作用途徑的植物。(3分)
  - (3)驅動植物演化出不同光合作用途徑的因子。(2分)
5. 年降雨量以及年均溫是影響全生物圈陸域 biomes 分布的兩個主要氣候因子；請回答下列問題：
  - (1)圖繪 Climate diagram。根據 Climate diagram 如何判定一區域是否有乾濕季?(5分)
  - (2)請說明水對植物的重要性，以及維管束植物吸收水分的機制。(5分)
  - (3)請說明溫度對生物個體的影響，以及生物個體如何調節其內在溫度在可忍受的範圍。(5分)
6. 說明下列估算族群數量的方法：
  - (1) capture-mark-recapture method (3分)
  - (2) 兩種估算植物族群數量的方法 (4分)
7. 請回答下列有關生物多樣性的問題：
  - (1)如何量化群聚(community)之物種多樣性；(5分)
  - (2)舉例說明影響生態系內群聚物種多樣性之因素；(3分)
  - (3)說明維持生物多樣性對生態系之重要性。(3分)
8. 說明 bottom-up and top-down control of primary production。(6分)

試題隨卷繳回