

UNIVERSITY OF KWAZULU-NATAL
SCHOOL OF AGRICULTURAL, EARTH & ENVIRONMENTAL SCIENCES
DISCIPLINE OF GEOGRAPHY
MAIN EXAMINATION: JUNE 2013
BIOGEOGRAPHY AND CLIMATIC CHANGE ENVS314W1

DURATION: 3 HOURS

TOTAL MARKS: 300

INTERNAL EXAMINER: Prof S. Proches
EXTERNAL EXAMINER: Prof S Grab

**INSTRUCTIONS: ANSWER ALL QUESTIONS IN SECTION A AND TWO
ESSAY-TYPE QUESTIONS FROM SECTION B**

**NOTE: THIS PAPER CONSISTS OF 2 (TWO) PAGES, PLEASE SEE THAT YOU HAVE
THEM BOTH.**

SECTION A

ANSWER ALL QUESTIONS (100 MARKS)

1. What is species occupancy? What does it measure? How is it calculated? (25)
2. What is the latitudinal gradient in species richness? What are the main exceptions from it? (25)
3. Illustrate and briefly explain a real or fictional case of parapatry indicative of long-distance dispersal, and one where two monophyletic sister taxa suggest vicariance. Specify what speciation mechanisms are involved. (25)
4. Briefly explain how similarity/dissimilarity measures can be used to construct phylogenetic trees and to produce regionalization schemata. What is recorded in the data tables at each step in either case? (25)

SECTION B

**ANSWER TWO QUESTIONS FROM THIS SECTION. EACH QUESTION CARRIES 100
MARKS.**

5. What are the forces driving the positive relationship between plant and insect diversity across ecosystems and geographic regions? Write an essay providing arguments in favour of a direct relationship, whereby plant diversity drives insect diversity, and in favour of an indirect one, specifying what other factors could drive both insect and plant diversity. (100)

6. Discuss the radiation of the Cape Flora, indicating commonalities and differences between and within the lineages involved, the origin of these lineages, the timing of the diversification, and key biotic and abiotic factors that facilitated this radiation. **(100)**
7. Discuss the evolutionary radiation within the cactus family, indicating the origins of the cactus lineage, factors that promoted diversification within the Americas, and provide examples of cactus species that colonized other parts of the world naturally or assisted by humans. **(100)**
8. In the context of present-day climate change, what habitats and species are the most likely to be impacted? Discuss factors including habitat fragmentation (natural and anthropogenic), dispersal abilities and niche breadth in explaining why these habitats and species are likely to be most impacted. **(100)**