

**UNIVERSITY OF KWAZULU- NATAL
DURBAN CENTRE: WESTVILLE CAMPUS
EXAMINATION:NOVEMBER 2011**

**SCHOOL : ENVIRONMENTAL SCIENCES
LEVEL : 1
MODULE : ENVIRONMENTAL SYSTEMS
CODE : ENVS120 W2H2
DURATION : 3 HOURS**

TOTAL MARKS : 150

**INTERNAL EXAMINERS: Dr. S. Pillay; Dr. J. Finch; Mr. P. Gumede
EXTERNAL EXAMINER: Prof. O. Mutanga**

ANSWER EACH SECTION IN A SEPARATE ANSWER BOOK

SECTION A : ATMOSPHERIC PROCESSES (50 MARKS)

ANSWER ONE OF THE FOLLOWING QUESTIONS:

1. Using clearly labelled diagrams, describe the chemical and physical characteristics of the earth's layered atmosphere.
2. On the 2nd of October 2011, two tornadoes developed over the South African interior. Describe the formation of these systems and how they are rated, and then comment on the likelihood of increased frequency and intensity of these systems with increasing global temperatures.
3. Geostrophic winds flow parallel to the isobars under balanced forces. Describe the forces involved and the effect of friction on this balance.

SECTION B :BIOSPHERIC PROCESSES (50 MARKS)

ANSWER ALL QUESTIONS OF THIS SECTION:

4. Define, providing examples where appropriate, the following:
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| Indicator, keystone and umbrella species | [5] |
| Continental, oceanic and habitat islands | [5] |
| Gause's law and resource partitioning | [5] |
5. Discuss types of endemism and outline the threats to endemic species. [10]
6. Discuss generalized rules, distribution patterns and environmental gradients used in biogeography to explain the distribution of species. [25]

SECTION C: LITHOSPHERIC AND HYDROSPHERIC PROCESSES
(50 MARKS)

ANSWER ONE OF THE FOLLOWING QUESTIONS:

7. The formation of soil is influenced by several factors. Write an essay on the role of five known factors that contribute to this process.
8. Discuss the evolution and characteristics of the major drainage basins of southern Africa.
9. Discuss the role of the asthenosphere in driving the plate tectonic processes and describe the interactions occurring at the main plate boundaries.
10. Write an essay on the main soil components and explain the importance of each of these components for soil fertility.