

UNIVERSITY OF KWAZULU-NATAL, DURBAN WESTVILLE
EXAMINATION: NOVEMBER 2011

SCHOOL : ENVIRONMENTAL SCIENCE
LEVEL : III
MODULE : ATMOSPHERIC SCIENCE
CODE : ENVS318

DURATION: 3HOURS

TOTAL MARKS: 300

INTERNAL EXAMINER: MR JP MULUMBA

INTERNAL EXAMINER: PROF S GRAB

UNIVERSITY OF WITWATERSRAND

INSTRUCTIONS: Answer THREE questions

1. a) Using well annotated diagrams, define and explain the relationships between the following concepts:
 - Pressure gradient force
 - Coriolis force
 - Geostrophic and ageostrophic flow

(50)

- b) Explain how the hydrostatic equation: $dP/dz = -\rho g$ is derived and in doing so, define all terms used.

(20)

- c) On the 02/10/2011 tornadoes struck Nigel and Ficksburg in the interior of South Africa. Explain the formation of these systems.

(30)

2. Define the term 'temperature inversion' and discuss possible causes and impacts of this atmospheric condition on air quality.

(100)

3. Discuss the latitude, curvature and vorticity effects on divergence and convergence in the southern hemisphere.

(100)

4. Climates have fluctuated over geological history under the influence of natural feedback systems. Explain clearly what is meant by a 'feedback system' and discuss some of the natural feedbacks that have influenced cyclical climate changes over time.

(100)