

UNIVERSITY OF KWAZULU-NATAL
SCHOOL OF AGRICULTURAL, EARTH & ENVIRONMENTAL SCIENCES
MAIN EXAMINATION: JUNE 2013
MODULE NAME & CODE: AIR POLLUTION ENV5711W1

DURATION: 3 HOURS

TOTAL MARKS: 300

INTERNAL EXAMINER: DR L RAMSAY
EXTERNAL EXAMINER: PROF S GRAB

INSTRUCTIONS: THIS PAPER CONSISTS OF TWO PAGES.

Answer three (3) of the following five (5) questions. Each question is worth 100 marks, giving a total of 300 marks.

QUESTION 1

Discuss the health implication of the key pollutants presented in the National Environmental Management: Air Quality Act 39 of 2004. What is the Act's approach to maintaining healthy levels of these pollutants? **(100)**

QUESTION 2

Using a local case study, provide a comprehensive review of the various meteorological and topographical controls on vertical and horizontal dispersion of air pollution. **(100)**

QUESTION 3

You are commissioned to model sulphur dioxide (SO₂) emissions from the SAPREF plant in South Durban to assess the contributions of this plant to ambient SO₂ concentrations. Compare various model options available to you and then highlight and justify your choice of modelling approach. **(100)**

QUESTION 4

You are the environmental manager of a large oil refinery in South Durban. Plant emissions of concern are sulphur dioxide (SO₂), particulate matter with an aerodynamic diameter less than ten microns (PM₁₀) and benzene (C₆H₆). Compare various abatement technologies available to you for mitigating emissions of these pollutants, highlighting your choice for each pollutant of concern. **(100)**

QUESTION 5

You are commissioned to develop an emissions inventory for a chemical storage facility on the Highveld. The site has two boilers that are ducted to a single stack. There are four chemical storage tanks on site, and a large region of graded land that is a potential dust source. Discuss your development and presentation of a comprehensive emissions inventory, presenting any limitations of your approach for each source category. **(100)**