

**UNIVERSITY OF SWAZILAND**

**FINAL EXAMINATION 2006**

**TITLE OF PAPER : Environmental Pollution**

**COURSE NUMBER : ERM 603**

**TIME : 3 Hours**

**INSTRUCTIONS : Answer ANY FOUR questions.**

**Begin the answer to each question  
on a separate sheet of paper.**

**Each question is worth 25 marks.**

**YOU ARE NOT SUPPOSED TO OPEN THE PAPER UNTIL PERMISSION TO DO SO HAS BEEN  
GRANTED BY THE CHIEF INVIGILATOR.**

### QUESTION 1

- (a) State some of the ways in which technology can be applied to *minimize* environmental impact. [ 6 marks]
- (b) Nitrogen occurs prominently in all spheres of the environment. Use a diagram to illustrate the nitrogen cycle. [12 marks]
- (c) In what important respect does the phosphorus cycle differ from cycles of other similar elements, such as nitrogen and sulphur? [ 2 marks]
- (d) Explain the meaning of the term *ionizing radiation*. [ 5 marks]

### QUESTION 2

- (a) Physical, chemical, and biological processes may all result in the deposition of sediments in the bottom regions of bodies of water. Discuss. [ 7 marks]
- (b) Discuss the effects of acute poisoning in humans by cadmium. [ 3 marks]
- (c) Sewage from domestic, commercial food processing, and industrial sources contain a wide variety of pollutants, including organic pollutants. Discuss the potential sources, and effects in water, of some of the primary constituents of sewage from a City Sewage System. [10 marks]
- (d) Under what circumstances does a contaminant become a pollutant? [ 5 marks]

### QUESTION 3

Write notes on the following:-

- (a) BOD and COD [ 5 marks]
- (b) Soaps [ 5 marks]
- (c) Ecosystem [ 5 marks]
- (d) Nuclear winter [ 5 marks]
- (e) Polychlorinated dibenzodioxins [ 5 marks]

#### **QUESTION 4**

- (a) Summarize the problems/gaps identified in the development of the National Solid Waste Management Strategy in Swaziland. **[10 marks]**
- (b) Discuss the causes and damaging effects of acid rain. **[10 marks]**
- (c) Water's unique temperature - density relationship results in the formation of distinct layers within non-flowing bodies of water. Discuss. **[ 5 marks]**

#### **QUESTION 5**

- (a) The reactions that occur following absorption of a photon of light to produce an electronically excited species are largely determined by the way in which the excited species loses its excess energy. List the number of processes by which this may occur. **[10 marks]**
- (b) Explain the causes and consequences to the environment of ozone layer destruction. **[ 7 marks]**
- (c) Discuss medical waste management in Swaziland. **[ 8 marks]**

#### **QUESTION 6**

- (a) Discuss the major environmental challenges of the Matsapha Industrial Estates. **[ 12 marks]**
- (b) In order to understand atmospheric chemistry and air pollution, it is important to have an overall appreciation of the atmosphere, its composition and physical characteristics. Discuss. **[13marks]**