

**UNIVERSITY OF SWAZILAND**

**FINAL EXAMINATION DECEMBER 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) Describe, with the aid of a diagram, a generalized manufacturing process viewed from standpoint of minimization of environmental impact. [10 marks]
- (b) Cycles of matter, often based on elemental cycles, are of utmost importance to the environment. What are the main features of the carbon cycle? [10 marks]
- (c) The study of the ecological and health effects of radio-nuclides involve consideration of many factors. Discuss. [5 marks]

### **QUESTION 2**

- (a) Describe the sources and effects of acute metal poisoning of  
(i) Cadmium  
(ii) Mercury [10 marks]
- (b) *State* the production and current management processes of waste by 5 Industries in Matsapha. [10 marks]
- (c) What are the five major classes of material making up the composition of atmospheric aerosol particles? [5 marks]

### **QUESTION 3**

- (a) List the primary constituents of sewage of Mbabane, the capital city of Swaziland. [10 marks]
- (b) Describe the composition of dry air within several kilometres of ground level. [5 marks]
- (c) Explain the term *nuclear winter*. [5 marks]
- (d) The physical condition of a body of water strongly influences the chemical and biological processes that occur in water. Explain. [5 marks]

#### **QUESTION 4**

- (a) Discuss the potential health benefits and hazards of Genetic Engineering. [12 marks]
- (b) The removal of particulate matter from gas streams is the most widely practised means of air pollution control. Explain how a venturi scrubber operates. [5 marks]
- (c) Summarize the sources, and effects and significance, of 4 important trace elements in natural waters. [8 marks]

#### **QUESTION 5**

- (a) What are the consequences of increased intensities of ground-level ultraviolet radiation caused by stratospheric ozone destruction? [5 marks]
- (b) Of all environmental hazards, there is little doubt that major disruptions in the atmosphere and climate have the greatest potential for catastrophic and irreversible environmental damage. What measures need to be taken in dealing with this problem? [10 marks]
- © Discuss the division of responsibilities for solid waste management at the level of Government Ministries in Swaziland. [10 marks]

#### **QUESTION 6**

- (a) Discuss the major waste management challenges faced by your Tinkhundla area. [12 marks]
- (b) Compare and contrast soaps and detergents. [10 marks]
- (c) What is the distinction between luminescence and chemiluminescence. [3 marks]