



**UNIVERSITY OF SWAZILAND**  
Faculty of Health Science

Department of Environmental Health  
Sciences  
Main Examination 2011

Title of paper: Water Resources Management

Course code: EHS 581

Time allowed: 2 HOURS

Marks allocation: 100 Marks

**Instructions:**

- 1) Answer **Four** questions
- 2) Each question is weighted 25 marks
- 3) Write neatly and clearly
- 4) Begin each question in a separate sheet of paper

This paper is not to be opened until the invigilator has granted  
permission

**QUESTION ONE**

- a) In about two pages, write about the following with regard to water resources conflicts management:  
Market mechanism as a motivation for water efficiency in farming  
Awareness raising  
International conflict solving  
Education and training **[20 marks]**
- b) Fully describe four points of water pricing that can be used in equitable water allocation. **[5 marks]**

**QUESTION TWO**

- 1.1. It is said that demand management consists of five P's: in about two pages explain the importance of these P's in water resources management. **[20 marks]**
- 1.2. Why do water managers have to charge consumers for water use, yet this is a natural resource? **[5 marks]**

**QUESTION THREE**

- a) What does the following terms **refer to in water resources management** and in about two pages explain **how can you apply them in creating incentive** for water demand management?
- a. Subsidies
  - b. Grants or soft loans
  - c. Tax allowances and tax exemptions
  - d. Market creation
  - e. Fines **[15 marks]**
- b) Consider a rain fed maize crop, where precipitation is 700mm, of which 100mm is intercepted and evaporates, 100mm runs off into streams. Of the 500mm that remains 300mm infiltrates into the soil, 100mm percolates to recharge ground water. The maize crop yield 400kg/ha. What is the water utilization efficiency of this rain fed crop? **[5 marks]**
- c) A alluvial, medium textured granite soil with coarse sand fraction, has the following parameters: moisture content (vol%) FC 20% and WP 10%. Maize crop is planned with rooting depth of 0.80m; and the soil water depletion fraction  $p = 0.60$ . What is the readily available moisture for the maize on this soil? **[5 marks]**

**QUESTION FOUR**

- a) Why are population forecasts important for water resources management? **[5 marks]**
- b) In a certain country, the President proudly presented the latest population statistics: the total population  $P = 50$  million people, the fertility rate  $f = 2$  average death rate of  $d = 1$ , and the population growth rate 3%.
1. What is the average life expectancy? **[5 marks]**
  2. What percentage of people dies each year? **[5 marks]**
  3. How many children are there per woman? **[5 marks]**
  4. How long will it take the population to double? **[5 marks]**