0UNIVERSITY OF SWAZILAND

Faculty of Health Sciences

DEGREE IN ENVIRONMENTAL HEALTH

MAIN EXAMINATION PAPER 2014

TITLE OF PAPER	:	WATER RESOURCES MANAGEMENT II
COURSE CODE	:	EHS 581
DURATION	:	2 HOURS
MARKS	:	100 MARK
INSTRUCTIONS	:	READ THE QUESTIONS & INSTRUCTIONS CAREFULLY
	:	ANSWER ANY FOUR QUESTIONS
	:	EACH QUESTION CARRIES 25 MARKS
	:	WRITE NEATLY & CLEARLY
	:	NO PAPER SHOULD BE BROUGHT INTO NOR OUT OF THE EXAMINATION ROOM
	:	BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER

DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR

Question 1

a. Describe four elements of water pricing that can be used in equitable water allocation. [20 marks]

b. Why do water managers have to charge consumers for water use, yet this is a natural resource? [5 marks]

Question 2

a) Briefly describe how can you apply the following approaches 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 [25 marks]

Question 3

a. 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]

b. Soil 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]

c. Explain two advantages of an increasing block tariff rates as opposed to flat rates in water tariffs [10 marks]

d. How can you use the block tariff rates to recover water supply cost? [5 marks]

Question 4

a. Explain the importance of population forecast in water resources management? [5 marks]

b. If the total population P = 100 million people, the fertility rate f = 2 average death rate of d = 1, and the population growth rate 3%.

   a. What is the average life expectancy? [5 marks]
   b. What percentage of people dies each year? [5 marks]
   c. How many children are there per woman? [5 marks]
   d. How long will it take the population to double? [5 marks]

Question five

a. A family has not more than E200.00 per month to spend on water bills. If the water price increased by 20%, do you expect their reaction to a price increase to be elastic or rigid? Give reason(s) for your answer. [10 marks]

b. How do you expect their reaction with regards to water demand to be? Explain your answer. [10 marks]

c. Describe the procedure that must be followed for water resources management in Swaziland to avoid conflicts with neighbouring countries. [5 marks]