UNIVERSITY OF SWAZILAND
Faculty of Health Science

Department of Environmental Health Sciences

Final Examination 2007

TITLE OF PAPER : WATER RESOURCE MANAGEMENT

COURSE CODE : EHS 541

DURATION : 3 HOURS

MARKS : 100

INSTRUCTIONS : READ THE QUESTIONS & INSTRUCTIONS CAREFULLY

: ANSWER ANY FIVE QUESTIONS

: EACH QUESTION CARRIES 20 MARKS

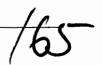: NO PAPER SHOULD BE BROUGHT INTO NOR OUT OF THE EXAMINATION ROOM

: BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER

DO NOT OPEN THE QUESTION PAPER UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATOR.

QUESTION ONE

1. What do you understand by Integrated Water Resources Management?   (5)

2. Mention five dimensions of integrated water resources management?   (5)

3. What does sustainable use of water resources mean?   (3)

4. Mention five demand-oriented measures in water resources management.   (5)
5. Mention two advantages of an increasing block rate as opposed to flat rate in water tariffs   (2)

QUESTION TWO

1. What are the components of a robust plan and what are the advantages of linear planning method over cyclic planning?   (11)
2. Give an estimate of the amount of "virtual" water that is equivalent with the production of 70kg of maize. If a ton of maize was exported to Mozambique how much virtual water is exported?   (5)

3. Mention two consumptive uses and two non-consumptive water uses.   (4)

QUESTION THREE

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 of 3%.
   1. What is the average life expectancy?   (5)
   2. What percentage of people die each year?   (5)
   3. How many children are there per woman?   (5)
   4. How long will it take the population to double?   (5)

QUESTION FOUR

   1. Water resource is an important resource above all other natural resources. Give five reasons to justify this.   (5)
   2. Give four factors that contribute to global water shortage.   (5)
   3. Global water shortage is a recipe for international conflicts. Given an opportunity to work towards harmonizing different interest for the world water uses, what will you do to avoid international conflicts?   (5)
   4. List five factors that contribute to unsustainable water resources development.   (5)

QUESTION FIVE

Consider a ten (10) day period of a maize crop, at a beginning of which the irrigation system breaks down so that no irrigation water is available over the entire period of 10 days. At day one the soil moisture is at field capacity. The following data are also given.

Potential evaporation Et_m	10 mm /d
Effective rainfall P_{eff}	0 mm /d
Rooting depth D	0.8m
Available soil moisture S_a	100 mm /m
Soil moisture depletion fraction p	0.55
Yield response facture	1.25

a. Calculate, for the 10 days period, the day-to day available moisture, and actual evapotranspiration. (5)

b. Calculate the reduction due to the break down of the irrigation system. (5)

c. Calculate the actual evapotranspiration if there is 25mm of effective rainfall on each of the 6th and 7th day. (5)

d. Calculate the reduction in yield for (c) and (d). (5)

20 marks