

UNIVERSITY OF SWAZILAND
Faculty of Health Sciences

DEGREE IN ENVIRONMENTAL HEALTH
SUPPLEMENTARY EXAMINATION PAPER 2005

TITLE OF PAPER : **WATER RESOURCES MAMAGEMENT**

COURSE CODE : **EHS 541**

DURATION : **3 HOURS**

MARKS : **100**

INSTRUCTIONS :

- : **READ THE QUESTIONS & INSTRUCTIONS CAREFULLY**
- : **ANSWER ANY FIVE QUESTIONS**
- : **EACH QUESTION CARRIES 20 MARKS.**
- : **WRITE NEATLY & CLEARLY**
- : **NO PAPER SHOULD BE BROUGHT INTO OR OUT OF THE EXAMINATION ROOM.**
- : **BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.**

**DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTE
BY THE INVIGILATOR.**

QUESTION ONE

1. Mention five demand-oriented measures in water resources management. (5)
2. Prove that when the a price-demand relation has the form $Q = C / P$ the price elasticity $E = -1$ (10)
 - a. In which situation is that the case? (3)
3. Mention two advantages of increasing block rate as opposed to flat rates. (2)

QUESTION TWO

1. What is the character of a robust plan? (Use a diagram to explain this). (10)
2. Mention two consumptive uses and two non-consumptive water uses. (5)
3. Why is cycle planning better than linear planning? (5)

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. How many percent of people dies 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. What make water resource an important resource above all other natural resources? Give five reasons for 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) days 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 E_{tm}	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 6 and 7 day. (5)
- d. Calculate the reduction in yield for (c) and (d). (5)

20 marks