UNIVERSITY OF SWAZILAND
Faculty of Health Sciences

DEGREE IN WATER RESOURCES AND ENVIRONMENTAL
HEALTH MANAGEMENT

FINAL EXAMINATION PAPER 2016

TITLE OF PAPER   : WATER RESOURCES MANAGEMENT II

COURSE CODE   :   EHM 419

DURATION   :   2 HOURS

MARKS   :   100

INSTRUCTIONS   :   READ THE QUESTIONS & INSTRUCTIONS
CAREFULLY

:   ANSWER **ANY FOUR** QUESTIONS

:   EACH QUESTION **CARRIES 25** 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 GRANTED BY
THE INVIGILATOR.

QUESTION ONE

a. You have just been employed as a water resources manager in Swaziland. You are to apply for funds to conduct a study that will give you an estimate of water resources available and use in the country. Explain five reasons you will advance to justify you application. [20 Marks]

b. Give an example that demonstrates a disadvantage of long term population forecasts in water resources planning. [5 Marks]

QUESTION TWO

a. Water is a natural resource, God given to mankind and a basic human right. Under normal circumstance it should be free for everybody and for all purpose. Explain five reasons why water cannot be provided for free despite the assertion mentioned? [20 Marks]

b. Mention two major precaution that ought to be taken into consideration when pricing water services [5 Marks]

QUESTION THREE

Write about the purpose of water pricing under the following headings:

i. Cost recovery

ii. Water use efficiency

iii. Opportunity costs

iv. Water scarcity

v. Internalizing externalities [25 Marks]

QUESTION FOUR

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-today available moisture, and actual evapotranspiration. (10)

b. Calculate the percentage of yield reduction due to the breakdown 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. [Use a separate table to show this] (10)

[25 Marks]

QUESTION FIVE

a. Water resource is one major force driving Swaziland economy. Using five reasons, explain the importance of water above all other natural resources driving the vision 2022 in Swaziland. [20 Marks]

b. What do you understand by 'water demand' in relation to water resources management? [5 Marks]