



UNIVERSITY OF SWAZILAND
Faculty of Health Sciences

DEGREE IN WATER RESOURCES AND ENVIRONMENTAL
HEALTH MANAGEMENT

MAIN EXAMINATION PAPER 2019

TITLE OF PAPER : WATER RESOURCES MANAGEMENT II

COURSE CODE : EHS 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. In applying for funds to conduct a study that will give your organization an estimate of water resources available and use in Eswatini. Explain five reasons you will advance to justify you application. [20 Marks]
- b. Give five (5) reasons you can advance to demonstrate the disadvantage of using 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 purposes. Explain five reasons why water cannot be provided for free despite the assertion mentioned above? [20 Marks]
- b. Mention two major precaution that ought to be taken into consideration then pricing water services [5 Marks]

QUESTION THREE

- a) Water pricing is one major tool to control demand in a river basin where water resources is inadequate and demand is high. Describe five advantages of using water pricing in the management of water resources in this river basin. (20 marks)
- b) Explain why when water price drastically and frequently changes there is little change in water demand and use unlike with other resources. (5 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 is also given.

Potential evaporation $E_{t,m}$	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 Marks]**
- b. Calculate the actual evapotranspiration if there is 25mm of effective rainfall on each of the 6th and 7th day. **[15 Marks]**

QUESTION FIVE

Water resource available in our environment is from rainfall and this precious resource is critical for our development and environmental sustainability. It is also true that rainfall in the SADC region is seasonal and that water resources get depleted in dry season. Briefly explain five water use and demand impacted by seasonality of rainfall in rural Eswatini. **[10 Marks]**

- a. Explain five factors that make estimation of rural water demand and patterns of use difficult. **[10 marks]**
- c. Mention five that factors contribute to unaccounted for water in water resources management systems. **[5 marks]**