

UNIVERSITY OF ESWATINI
DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND
PLANNING

MAIN EXAMINATION DECEMBER 2019

B.Sc. and B.Sc. Ed. II

TITLE OF PAPER : **WATER RESOURCES**

COURSE NUMBER : **GEP232**

TIME ALLOWED : **THREE (3) HOURS**

INSTRUCTIONS : **SECTION A IS COMPULSORY**
ANSWER ANY TWO (2) QUESTIONS FROM
SECTION B. ILLUSTRATE YOUR ANSWERS
WITH APPROPRIATE DIAGRAMS AND SHOW
YOUR WORKING IN ALL CALCULATIONS

MARKS ALLOCATED : **QUESTION ONE CARRIES 40 MARKS AND THE**
OTHER QUESTIONS CARRY 30 MARKS EACH

THIS PAPER IS NOT TO BE OPENED UNTIL PERMISSION HAS BEEN
GRANTED BY THE INVIGILATOR

GEP232: WATER RESOURCES – DECEMBER 2019

SECTION A: COMPULSORY QUESTION**Question 1**

- a) Discuss the importance of the hydrologic cycle in water resources development. (20 marks)
- b) Table 1 below shows the drainage areas enclosed between successive isohyetal lines for a storm occurring in a 2500 km² catchment. Calculate the mean areal precipitation in the catchment using the isohyetal method.

Table 1: Isohyetal areas in a drainage basin

| Isohyetal interval (mm) | Area (km ²) |
|-------------------------|-------------------------|
| 0 – 50 | 1250 |
| 50 – 100 | 750 |
| 100 – 150 | 500 |
| 150 – 200 | 0 |

(20 marks)

(40 Marks)**SECTION B: ANSWER ANY TWO QUESTIONS****Question 2**

- a) Describe any two methods of discharge measurement. (10 marks)
- b) With an aid of diagrams, differentiate between orographic and frontal precipitation. (20 marks)

(30 Marks)**Question 3**

- a) Explain the factors affecting the infiltration rate in a drainage basin. (15 marks)
- b) Describe any three (3) methods of measuring the infiltration rate. (15 marks)

(30 Marks)**Question 4**

- a) Discuss the importance of measuring evaporation in the sector of water resources. (15 marks)
- b) Use the mass transfer method to calculate the evaporation from open water, given the following variables: $U_2 = 8.5$ km/hour; $e_a = 13.8$ mm of mercury; $e_d = 11.5$ mm of mercury. (15 marks)

(30 Marks)**Question 5**

Discuss in details at least six (6) factors that affect the runoff of a river basin. **(30 Marks)**