

UNIVERSITY OF SWAZILAND

DEPARTMENT OF GEORAPHY, ENVIRONMENTAL SCIENCE AND PLANNING

RE-SIT EXAMINATION: JULY, 2017

BSc and BSc Ed. II

TITLE OF PAPER : WATER RESOURCES

COURSE NUMBER : GEP232

TIME ALLOWED : THREE (3) HOURS

**INSTRUCTIONS : ANSWER TWO QUESTIONS FROM SECTION A
AND TWO QUESTIONS FROM SECTION B
ILLUSTRATE YOUR ANSWERS WITH
APPROPRIATE DIAGRAMS**

MARKS ALLOCATED : QUESTIONS ONE CARRY 25 MARKS EACH

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

SECTION A: ANSWER ANY TWO QUESTIONS

QUESTION 1

- (a) For each weather element/parameter describe an instrument used for its measurement. (10 marks)
 - (b) Outline the problems associated with weather observation. (5 marks)
 - (c) Discuss how weather affects our daily activities. (10 marks)
- (25 Marks)**

QUESTION 2

- (a) Explain the laws of horizontal motion. (10 marks)
 - (b) Discuss why velocities of local winds, are least at dawn and sunset but greatest between 1300 hours and 1400 hours. (8 marks)
 - (c) Explain the causes of mountain valley winds. (7 marks)
- (25 Marks)**

QUESTION 3

- (a) Explain the mechanisms of heat transfer within the Earth-atmospheric system. (10 marks)
 - (b) Discuss the factors that determine the sun's altitude and how each affects the amount of solar energy received by the Earth. (15 marks)
- (25 Marks)**

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SECTION B: ANSWER ANY TWO QUESTIONS

QUESTION 4

- a) Discuss how infiltration affects the runoff of a catchment. (15 marks)
 - b) Explain how infiltration can be measured. (10 marks)
- (25 Marks)**

QUESTION 5

- a) Describe the assumptions of the unit hydrograph and its practical applications. (10 marks)
 - b) Table 1 below presents the One-day Unit hydrograph ordinates. Calculate the surface runoff resulting from an effective rainfall storm of 16 mm for a duration of one day. (15 marks)
- (25 Marks)**

Table 1. One-day Unit hydrograph ordinates

Time (days)	One-day Unit Hyd. Ordinates (m ³ /s)
1	0.00
2	1.8
3	6.0
3.5	6.33
4	5.53
5	3.51
6	2.36
7	1.57
8	1.02
9	0.53
9.5	0.00

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QUESTION 6

- a) Identify and explain one method used in assessing the available water resources of a drainage basin. (10 marks)
 - b) Figure 1 below shows the flow duration curve for the Zambezi River at Livingstone. Estimate the preliminary storage capacity of a proposed reservoir in order to meet the demand 50% of the time. (15 marks)
- (25 Marks)**

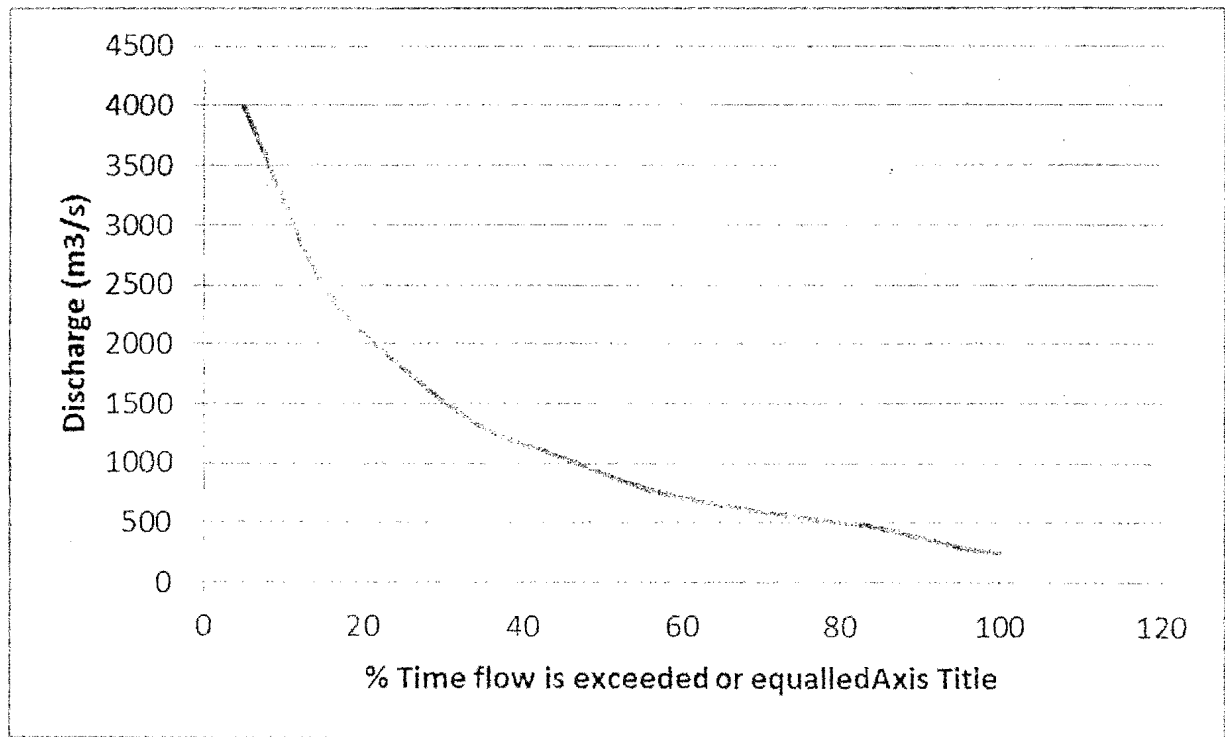


Figure 1 Flow duration curve for the Zambezi River at Livingstone.