



**UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER**

PROGRAMME: BSC ABE. II

COURSE CODE: ABE 204

TITLE OF PAPER: LAND SURVEYING

TIME ALLOWED: TWO (2) HOURS

**INSTRUCTIONS: ANSWER QUESTION ONE AND ANY TWO OTHER
QUESTIONS.**

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GRANTED BY THE CHIEF INVIGILATOR**

SECTION I: COMPULSARY

QUESTION ONE

- A) Draw a contour map using the contour grid shown on Figure 1 in the following page using a contour interval of 10 m. The grid was drawn using a 1: 5000 scale and a grid north. The reduced levels on the grid were produced using the rise and fall method and the units are meters (m). The development site in question was a section of a development site in Xia Xia, Mozambique. The map should indicate the title box, boarder line and all the identification information that has to be included on such maps. [25 marks]
 - B) What are the other methods of contouring besides the Grid? [2 marks]
 - C) Calculate the slope between VW. [5 marks]
 - D) If the spacing between grid points was 5.0 m, calculate the area of the development site. [5 marks]
 - E) Indicate the area that you can propose for use as a botanical garden on the contour map and state your reasons for doing so. [3 marks]
- [40 marks]**

SECTION B: ANSWER ANY TWO QUESTIONS

QUESTION TWO

- A) State the instruments or techniques that are used in direct distance measurements as well as in optical distance measurements. [5 marks]
- B) Describe with the aid of a sketch how the electromagnetic distance measurement (EDM) instruments operate. [14 marks]
- C)
 - i. Name any three (3) methods of linear measurements used in surveying. [3 marks]
 - ii. A surveyor measured the length of a dam flood spillway using a dumpy level. During measurement the upper stadia reading was recorded in the field book as 3.850 m, while the lower one was 1.450 m. Calculate the flood spillway length. [6 marks]
 - iii. Which method of linear measurement could have been used to estimate the length of spillway, if the surveyor knew his/her pace factor, but there was no dumpy level available? [2 marks]

Examination NO:.....

54 ● 54 ● 64 ● 73 ● 89 ●

W

53 ● 52 ● 69 ● 75 ● 95 ●

47 ● 51 ● 61 ● 93 ● 82 ●

49 ● 57 ● 65 ● 69 ● 75 ●

V

47 ● 59 ● 56 ● 63 ● 62 ●

QUESTION THREE

- A) What are the three methods that can be used for slope measurement? [3 marks]
- B) A land use planner was given a contour map or plan showing an area proposed for use as a botanical garden by the Mankayane Town Board. The map was drawn on a scale of 1:1000. The land use planner was asked to determine the general slope of the area in order to facilitate decision making and planning. While doing this, she discovered that one of the major slope breaks occurred between contour lines 29.0 m and 34.0 m, whose distance was 10 cm apart.
- i. Calculate the percentage slope for this slope break. [7 marks]
- ii. In your opinion state if this slope would be suitable for the establishment of a botanical garden and give your reason why it is suitable. [5 marks]
- C) During the setting-out of a botanical garden, the site in question had to be levelled. To do this a topographic survey of 30 m x 30 m was conducted in an attempt to provide the required contour map from which a formation depth of 1.5 m was determined. The sum of N (the number of times the reduced level has been used) was computed as 40.0, while the total height of the reduced level multiplied by N was 4840.0 m.
- i. Calculate the mean height. [5 marks]
- ii. Calculate the depth of excavation. [5 marks]
- iii. Determine the volume of excavation. [5 marks]

QUESTION FOUR

- A) What are the three types of a surveyor's level? [6 marks]
- B) Name the two methods that are used for booking levelling data. [4 marks]
- C) A group of second year students at the University of Nottingham had a surveying field trip where they were assigned to level a field section of Noting Hill farm on 15 October, 1971 as part of their levelling practical. The Bench Mark (BM) used during the exercise was 98.760 m above ordinance datum (AOD). The Back sight (BS) taken at the BM was 0.663 m and the subsequent measurements were intermediate sights (IS) of 1.946 m, 1.008 m and 1.153 m with a fore sight (FS) of 1.585 m. The BS take from the next level station was 2.787 m and the next two measurements were IS of 2.270 m and 1.218 m with a FS of 0.646 m.

Book the levelling data on Table 1 and carryout the arithmetic checks. [20 marks]

Examination NO.:.....

Table 1.....

Surveyor: Name and Location of Site:

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Date:..... Instrument Type and NO.:.....

Weather:

Back Sight	Intermediate Sight	Fore Sight	Rise	Fall	Reduced Level	Distance (m)	Remarks

[20 marks]