UNIVERSITY OF SWAZILAND

RESIT EXAMINATION PAPER

PROGRAMME: BSC ABE II

COURSE CODE: ABE207

TITLE OF PAPER: LAND SURVEYING

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY TWO OTHER QUESTIONS.

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SECTION I: COMPULSARY

QUESTION ONE

A) i. What are the **three (3)** methods of contouring? **(6 marks)**

ii. Discuss briefly the applications of contouring in agriculture? **(7 marks)**

B) i. What is the role of **signals** and **symbols** in Land surveying? **(2 marks)**

ii. State the meaning of the signals and symbols shown in **Figure 1** as used in surveying. **(10 marks)**

C) A topographic survey of **Neverland**, a development site in **Terrabethea** with dimensions of **60 m x 40 m** was conducted by a surveyor named **Gustavo** in April 1959 **(Figure 1)**. This was done in an attempt to provide useful information for planning purposes. To do this a contour plan of the area had to be drawn.

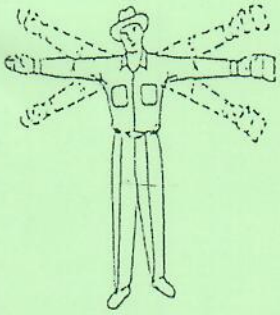
i. Draw a contour plan of **Neverland** on Figure 1shown of the **following page** using a contour interval of 10 m. The contour plan should have a **border line** and a **title box** with all the technical information that ought to be there. The **grid north** could be assumed for this contour plan. **(15 marks)**

[40 marks]

EXAMINATION NUMBER: .....

i. .....

ii. .....



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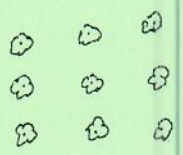

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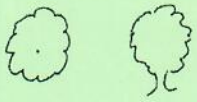

v. .....

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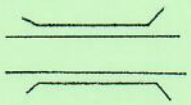

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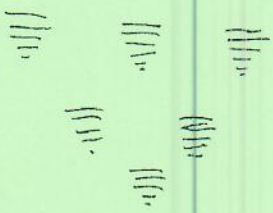

x. .....

Figure 1. Common surveying signals and symbols.

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 diagram how the **electromagnetic distance measurement** (EDM) instruments operate. **(14 marks)**

C) i. Name any **three (3)** methods of linear measurements used in surveying. **(6 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. **(5 marks)**

[30 marks]

600 ● 780 ● ● 950

700 ● 750 ● ● 850

680 ● 720 ● ● 830

550 ● 710 ● ● 750

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QUESTION THREE

A) Briefly discuss the **land surveying process** and use examples of surveying techniques which utilize the process. **(10 marks)**

B) In an attempt to accurately measure the depth of a gully, which was increasing at a rate of **30.0 mm** per month on average, Mr. Mgabhi, a Land Use Planner, used an abney level for measurement. The abney level recorded the angle of elevation from the horizontal plane of sight as $\mathbf{20^0}$. The distance between the survey station and the gully was found to b **30.0 m**, while Mr. Mgabhi's eyesight height measured 1.6 m.

i. Compute the **depth** of the gully. **(4 marks)**

ii. If Mr. Mgabhi wanted to apply stabilisation measures to the gully at a depth of 13.0 m, where there was an impending layer. **How long** did he have to wait for the gully to reach this depth? **(6 marks)**

iii. **State** and **describe** the **cheap alternative** method that **Mr. Mgabhi** could have used to measure the **depth** of the **gulley** other than the **abney level.**

(10 marks)
[30 marks]

QUESTION FOUR

A) Name any **three** (3) methods of computing areas from maps other than the **Simpson's** and **Trapezoidal's Rules.** **(6 marks)**

B) The following chain surveying data were recorded in the field when chaining and measuring off-sets of a proposed road or track from a near-by embankment (Table 1). Compute the area between the road and the embankment using the **Simpson's rule.** **(12 marks)**

Table 1. Embankment chaining field data.

Station	A	B	C	D	E	F	G	H	I	J	K	L
Chainage (m)	0	15	30	45	60	75	90	105	120	135	150	165
Offset (m)	6.3	4.2	3.8	2.1	8.2	9.3	6.7	4.6	3.2	1.2	0.2	1.0

C) The Kwaluseni Campus of the University of Swaziland uses floor bench marks. The multi-purpose hall (MPH) floor bench mark is **653.80 m AOD** and the Chapel or Religious centre bench mark is **654.20 m** AOD.

i. Calculate the height difference between the chapel and the MPH?

(6 marks)

ii. If the average distance between the **MPH** and the chapel is 500 m, calculate the slope between the two locations. **(6 marks)**

[30 marks]