# UNIVERSITY OF SWAZILAND

## SUPPLEMENTARY 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.**

**DO NOT OPEN THIS PAPER UNTIL PERMISSION HAS BEEN GRANTED BY THE CHIEF INVIGILATOR**

## SECTION I: COMPULSORY

## QUESTION ONE

**A)**     Describe the difference between a **level line** and a **horizontal line** with the **aid** of a

          diagram.                                                              **(8 marks)**

**B)**     Differentiate between plane surveying and geodetic surveying with particular reference to

          a level line and horizontal line.                                     **(5 marks)**

**C)**     Levelling as a surveying technique is affected by the Earth's curvature and Atmospheric

          Refraction. Briefly describe how levelling is affected by these two entities.    **(12 marks)**

**D)**     A levelling staffs was held at a distance of 200 m away from a surveyor's level and a

          reading of **2.758 m** was obtained.

          **i.**     Compute the correction due to **curvature and refraction**, empirically.  **(5 marks)**

          **ii.**    Use a diagram or sketch to reflect the correction.              **(5 marks)**

          **iii.**   Calculate the **corrected** reading due to the **combined effect**.         **(5 marks)**

                                                                               **[40 marks]**

## SECTION B:  ANSWER ANY TWO QUESTIONS

### QUESTION TWO

A)    Briefly discuss the role of signals and symbols in surveying.            (5 marks)

B)    State the meaning of the signals and symbols shown in **Figure 1** as used in land surveying.                                                                       (20 marks)

C)    Briefly describe the land surveying process stating the three stages involved.    (5 marks)

[30 marks]

### QUESTION THREE

A)    What are the **three (3)** types of a surveyor's level?                       (6 marks)

B)    Name the two methods that are used for booking levelling data.            (4 marks)

C)    The levelling data shown in **Figure 2** was conducted by Mr Vusi Msimango on a partly cloudy day as part of his assignment for the course **ABE 204: Land Surveying**, in August, 2007. Book the data using the rise and fall method on Table 1 and carryout the necessary arithmetic checks.                                          (20 marks)

[30 marks]

**EXAMINATION NUMBER:** ...........................................................................
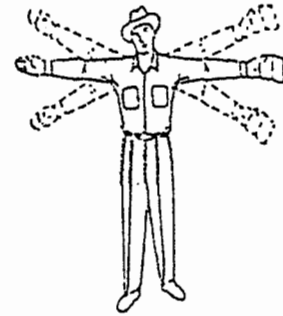
i. ...................................   ii. .............................   iii. .......................

iv. ..................................   v. ..............................   vi. ........................
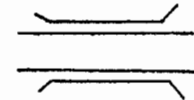
vii. ...................................   viii. ..............................   ix. .....................

x. ...................................

Figure 1. Common surveying signals and symbols.

41

1st SEM.2011/2012

Height of collimation = 730.00m + 0.45m = 730.450m

0.450 (BS)    1.720 (IS)    1.850 (IS)    1.980 (IS)    2.090 (FS)

Height of collimation = 730.450m + (2.090m − 1.450m) = 731.090m

1.450 (BS)    1.680 (IS)    1.855 (IS)    2.040 (IS)    1.555 (FS)

0.640

0.190

Height of collimation = 731.090m + (1.155− 0.965m) = 730.900m

0.965 (BS)    1.205 (IS)    1.495 (IS)    1.775 (IS)    2.030 (IS)    2.150 (IS)    2.050 (FS)

730.00m

P

Q

R
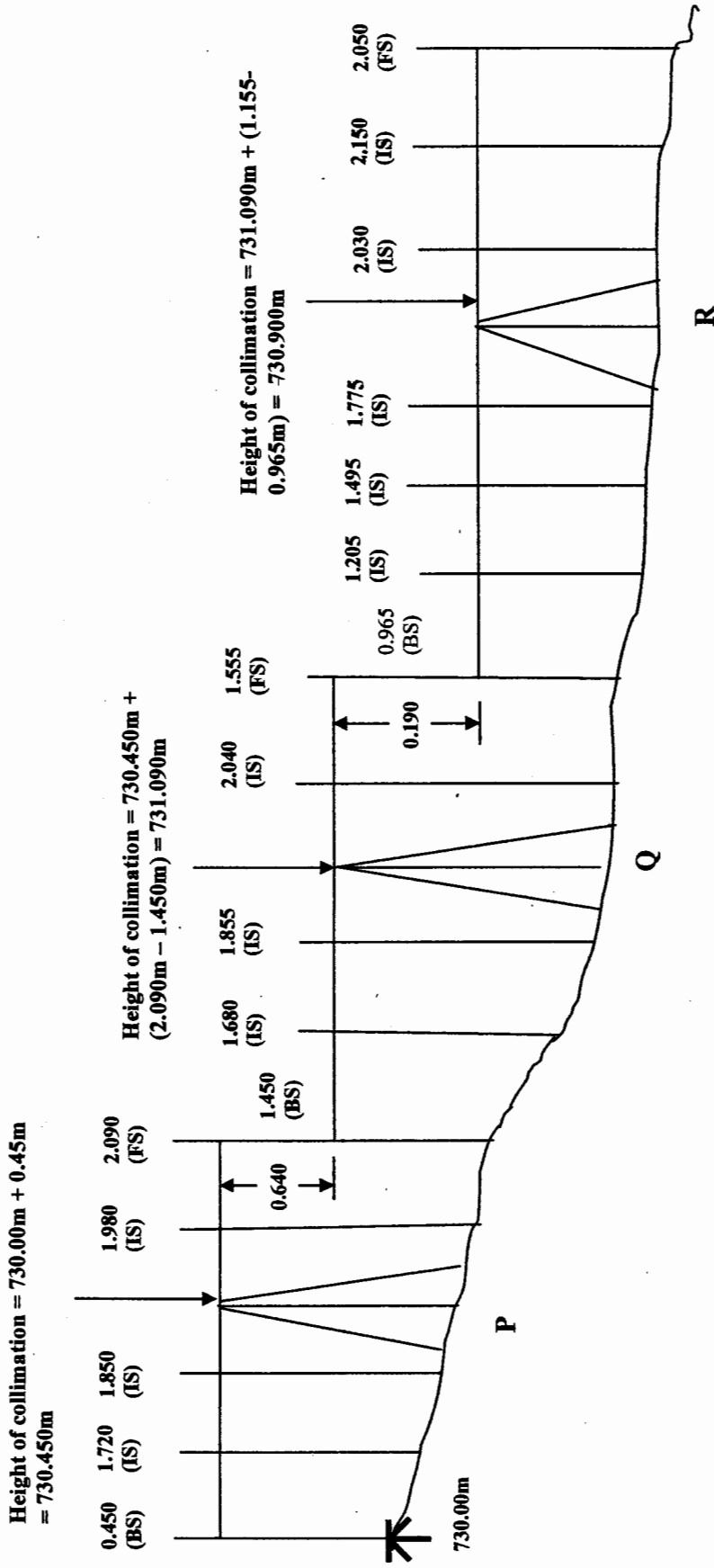
Figure 2. Road section between Cardiff Hall and the Education Centre, UNISWA, Luyengo.

42

**Examination N0.:**................................................................................

**Table 1:** ..................................................................................

**Surveyor:** ...............................  **Name and Location of Site:** ......................................

....................................................................

....................................................................

**Date:**..........................  **Instrument Type & N0.:**..................................

**Weather:** ..............................................................................

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

43

## 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)    i.     Define offset as used in chain surveying.      **(2 marks)**

      ii.     What are the **three (3)** methods of measuring offsets?      **(6 marks)**

C)    The chain surveying data on Table 1 were recorded in the field when chaining and measuring **off-sets** of a proposed road or track from a near-by embankment. Compute the area between the road and the embankment using both Simpson's and Trapezoidal rules.      **(16 marks)**

Table 1. Embankment chaining field measurements.

| 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 |

**[30 marks]**