



**UNIVERSITY OF SWAZILAND  
SUPPLEMENTARY EXAMINATION PAPER**

**PROGRAMME: DIPLOMA IN AGRICULTURE 2  
DIPLOMA IN AGRICULTURAL EDUCATION 2**

**COURSE CODE: LUM 202**

**TITLE OF PAPER: LAND SURVEYING**

**TIME ALLOWED: TWO (2) HOURS**

**SPECIAL MATERIAL REQUIRED: NONE**

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

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GRANTED BY THE CHIEF INVIGILATOR**

**SECTION ONE: COMPULSORY****QUESTION ONE**

The rail levels of an existing railway were to be checked and raised as necessary. Points A, B, C, D, E, F, and G were marked on the rails at regular 20m intervals and the following levels were taken (all measurements in meters):

BS: 2.80m on OBM 25.10

IS on A, B, and C: 0.94, 0.76, and 0.57 respectively.

FS and BS at change point D, **on the line of section**: 0.37 and 1.17 respectively.

IS on E and F: 0.96 and 0.75 respectively.

FS on G: 0.54

- (i) Book and reduce these readings using the **rise and fall** method and carry out the appropriate checks. **[25 Marks]**
- (ii) Assuming the levels at A and G were correct, calculate the amount by which the rails would have to be lifted at the intermediate points to give a uniform gradient throughout. **[15 Marks]**

**SECTION TWO: ANSWER ANY TWO QUESTIONS****QUESTION TWO**

- A. Define the term "traverse" as used in land surveying. **[5 Marks]**
- B. Briefly describe how **chain and compass traversing** is carried out. **[15 Marks]**
- C. Given that the calculated area on a map of scale 1:1000, was  $6000\text{cm}^2$  and that the area was measured using a chain that was 0.2% too short. Calculate the true area and percentage error of the area. **[10 Marks]**

**QUESTION THREE**

- A. Briefly describe how one can go about chaining on a sloping ground. A sketch should be used where appropriate to illustrate your facts. **[10 Marks]**
- B. List any three (3) methods that can be employed when measuring horizontal distances other than a tape measure. **[6 Marks]**
- C. Which of the three (3) methods would you consider as most accurate and why? **[4 Marks]**
- D. Given that two (2) extreme contour lines, as depicted by a contour map of scale 1:100, altitudes of 30.0m and 35.0m formed the boundaries of an arable land. Calculate the slope of the arable land assuming that the width of the field was 20.0cm. **[10 Marks]**

**QUESTION FOUR**

A. A field officer was asked by a farmer to determine the size of his field in an attempt to eventually compute the quantities of inputs for his field. Unfortunately, the officer and the farmer had no measuring equipment other than the officer's known pace factor of 0.60.

- (i) What method of measurement was the field officer supposed to use? [2 Marks]
- (ii) State any two (2) limitations of this method. [4 Marks]
- (iii) If the recorded paces of the four (4) sides of the field were as shown in the table below, compute the area, in hectares, of the field. [15 Marks]

<b>FIELD DATA</b>	<b>AB</b>	<b>BC</b>	<b>CD</b>	<b>DA</b>
<b>LENGTH (PACE)</b>	<b>100</b>	<b>40</b>	<b>87</b>	<b>45</b>

B. Name any three (3) methods of taking measurements in the vertical plane. [9 Marks]