

1st SEM.2005/2006



UNIVERSITY OF SWAZILAND
FACULTY OF AGRICULTURE
FINAL EXAMINATION PAPER

**PROGRAMME: DIPLOMA IN AGRICULTURE 11 AND DIPLOMA
IN AGRICULTURAL EDUCATION II**

COURSE CODE: LUM 202

TITLE OF PAPER: LAND SURVEYING

TIME ALLOWED: TWO (2) HOURS

SPECIAL MATERIAL REQUIRED: NONE

INSTRUCTIONS: ANSWER QUESTIONS ONE AND ANY OTHER
TWO QUESTIONS

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GRANTED BY THE INVIGILATOR

SECTION ONE: COMPULSORY**QUESTION NUMBER ONE**

(a) In order to find the rail levels of an existing railway, a point A was marked on the rail, then points at distances in multiples of 20m from A, and the following readings in meters were taken.

Back sight 3.39 on O. B.M 23.10

Intermediate sights on A, A +20, and A+40 were 2.81, 2.51 and 2.22 respectively.

A + 60: change point; foresight 1.88, back sight 2.61

Intermediate sights on A + 80 and A + 100 were 2.32 and 1.92

And finally a foresight of 1.54 on A + 120

i) Tabulate the above readings on the collimation system and carry out all the arithmetic checks **(15 marks)**

ii) Assuming that the levels at A and A + 120 were correct, calculate the amount by which the rail would have to be lifted at the intermediate points to give a uniform gradient throughout **(10 marks)**

(b) In an attempt to measure the height of a tree branch, the readings on a leveling staff taken through the lower and upper stadia hairs were respectively 3.35 and 3.95 respectively and the angle of elevation read from the abney level was 15° . Making provision for your height, what is the height of the branch from the ground level? **(10 marks)**

(c) Define or explain very briefly what you understand by the following:

(i) Land surveying **(2 marks)**

(ii) Leveling **(2 marks)**

(iii) Bench mark **(1marks)**

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

(a) In an attempt to accurately measure the depth of a gully which was increasing at an average rate of 10.0cm per month, an abney level was used. The level recorded an angle of depression of 20° . The distance between the survey station and the gully was 30.0m. If the height of the observer is 1.5m,
(i) Compute the depth of the gully (8 marks)

(ii) It is envisaged to start applying stabilization measures when the gully is 9.8m deep. How long would the observer have to wait before commencing the treatment. (5 marks)

(b) What is a contour map (3 marks?)

(c) Discuss the three methods commonly used in contouring. (9 marks)

(d) Given that the calculated area on a map of scale 1:1000 was 3000cm^2 and that the lengths were measured using a chain that was 0.2% too short, calculate the correct or true area in ha. Round your answer to the nearest whole number. (5 marks)

QUESTION THREE

(a) Calculate the area of the plot shown in Fig 1 using the Trapezoidal rule. The off set, scaled from the plan at intervals of 10m are as presented in table 1 (15 marks)

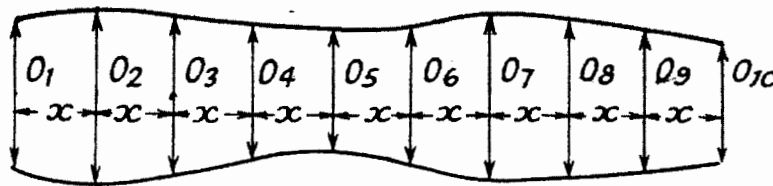


Fig.1: Area of land

Table 1: Records of offsets

offset	O_1	O_2	O_3	O_4	O_5	O_6	O_7	O_8	O_9	O_{10}
Length(m)	16.76	19.81	20.42	18.59	16.76	17.68	17.68	17.37	16.76	17.68

(b) A WILD dumpy level was used to measure the length of an excavation site and the two distal stadia hairs recorded 3.410m and 2.200m. Calculate the length of the excavation site. (10 marks)

(c) Describe with the aid of a sketch how one could measure the difference in height between any two points on a slope using a level. (5 marks)

QUESTION FOUR

- (a) A railway cutting has a formation width of 10m and the side slopes are 1 vertical to 5 horizontal. The ground surface is everywhere horizontal. The depths of the cutting at the centre line are given by table 2.

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Table 2; Depth of cut along a rail line

Distance (m)	0	50	100	150	200	250	300
Depth (m)	6.64	6.64	7.2	8.6	8.4	9.2	10.4

Compute the volume of the excavation in m^3 over this length of cutting using the trapezoidal formula. (20 marks)

- (b) A bicycle wheel odometer or measuring wheel was used to measure the width of a maize field and it recorded 537.5 revolutions. During calibrations, a known distance of 50.0m was used and the odometer registered 100.0 revolutions. Calculate the width of the field in meters (10 marks)