

UNIVERSITY OF SWAZILAND
FACULTY OF SCIENCE
FINAL EXAMINATION 2010

B.A II, B.Ed. II, BSc.II and B.A.S.S II.

TITLE OF PAPER : ELEMENTARY SURVEYING AND CARTOGRAPHY

COURSE NUMBER : GEP 213

TIME ALLOWED : THREE (3) HOURS

INSTRUCTIONS : ANSWER ANY THREE (3) QUESTIONS INCLUDING
QUESTION ONE (1) WHICH IS COMPULSARY.
MARKS WILL CONSIDER CLEARLY
ARTICULATED AND LOGICAL WORK FOR ALL
CALCULATIONS.

ALLOCATION OF MARKS: QUESTION ONE CARRIES FOURTY (40) MARKS
AND THE OTHER QUESTIONS CARRY THIRTY
(30) MARKS EACH.

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INVIGILATOR**

SECTION I : COMPULSARY

QUESTION ONE

The area on Figure 1 was levelled to facilitate the planting of grass or tuff for use as a sports field. A land surveyor was asked to verify the levelling accuracy of the sports field prior to grass establishment. To do this she divided the sports field into three (A, B, and C) to facilitate topographic assessments and measurement of slope. The first subscript e.g. A₁ represented the upper part of the slope break, while the second (A₂) represented the lower part of the slope break. These segments reflected the major slope differences that were evident on site. The dimensions of the pitch were given by the client as 100.0 m for the length and 50.0 m for the width. The measurements taken by the surveyor in her assessments are reflected on Figure 1.

Table 1. Field attributes of the proposed sports field

Measurement Point		Spot Height (m)
A	A ₁	0.490
	A ₂	2.110
B	B ₁	0.800
	B ₂	2.150
C	C ₁	0.625
	C ₂	2.740

- a) i. Name the **three** types of the surveyor's level that could be used for this kind of topographic assessment and the main measurement **accessory** used in levelling. **(8 marks)**
- ii. Which type of the three cross hairs or stadia did the surveyor use for this kind of work (Levelling)? **(2 marks)**

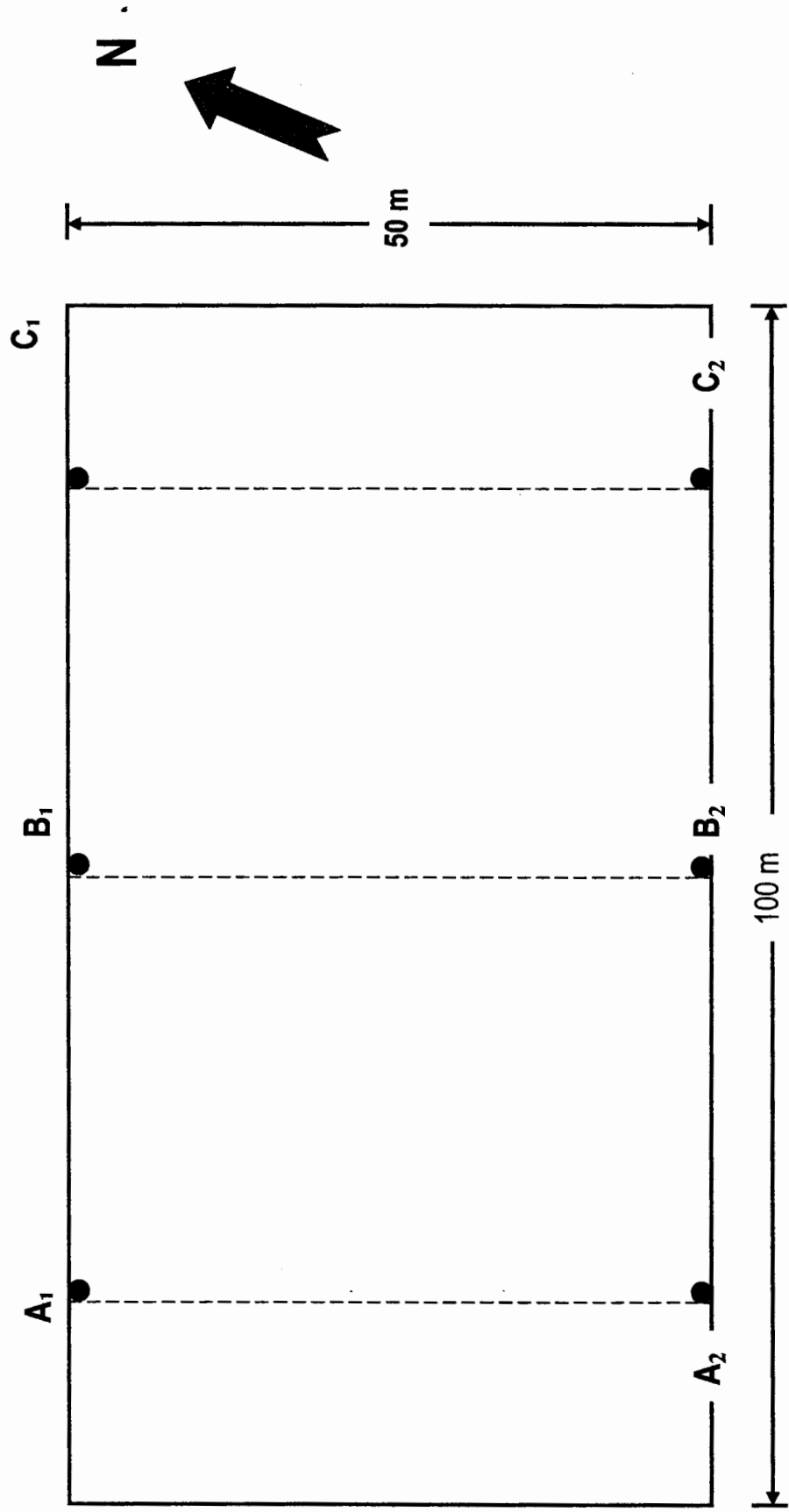


Figure 1. Proposed sports field layout

- b) i. Calculate the average slope of the sports field. (10 marks)
- ii. To facilitate drainage and ease of playing on the field a slope of 2% is generally recommended. According to your calculations, is the average slope of the field suitable to avoid flooding and permit comfortable playing?
(3 marks)
- c) If the required top soil to be applied on the whole field prior to planting was 100 mm, calculate the quantities of top soil in hectares (ha) that would be needed for the whole field. (10 marks)
- d) Briefly describe the **land surveying process** including the three stages involved in it. (7 marks)
- [40 marks]

SECTION B : ANSWER ANY TWO QUESTIONS

QUESTION TWO

- a) In not more than four (4) lines, describe the relationship between surveying and cartography. (5 marks)
- c) Show by definition that the following types of north are different:
- Grid or map north. (2 mark)
 - Magnetic north. (2 mark)
 - True north. (2 mark)
- d) Discuss the advantages of maps compared to globes. (10 marks)
- (30 marks)

QUESTION THREE

- a) What are the **three** (3) methods used for contouring? **(6 marks)**
- b) Draw a contour map using the contour grid shown on 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 at Lubulini in the Lowveld of Swaziland. The map should indicate the title box, boarder line and all the identification information that has to be included on such maps. **(24 marks)**
(30 marks)

QUESTION FOUR

- a) Use the attached map of Swaziland showing the four Administrative Regions to make a choropleth map, which should indicate the data reflected on Table 1. Note that the map was drawn using a **grid north**. **(16 marks)**

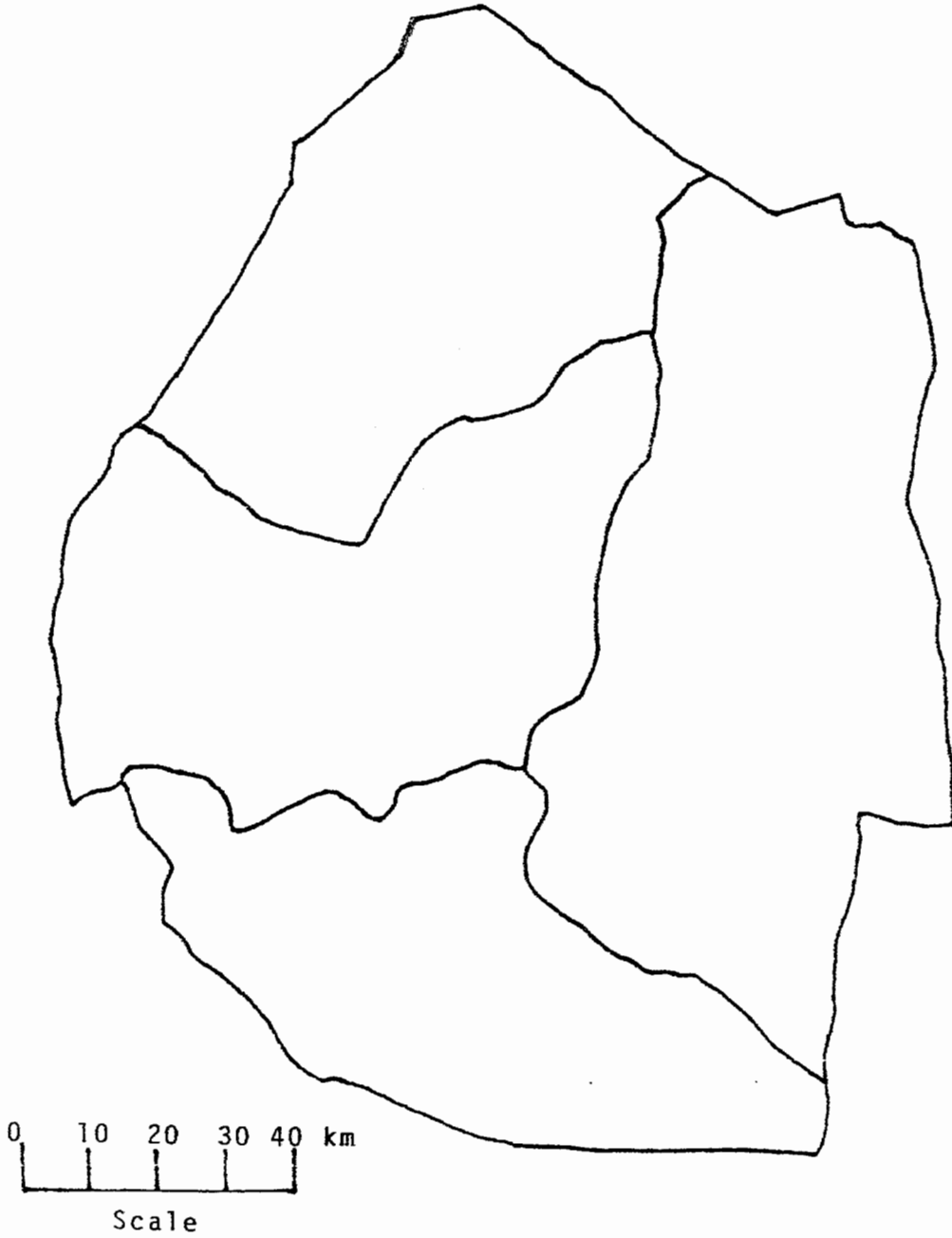
Table1. Hypothetical voter eligible human population in Swaziland

Region	Population
Hhohho	340, 000
Manzini	360, 000
Shiselweni	270, 000
Lubombo	90, 000

Examination NO:.....

54	•	54	•	64	•	73	•	89
53	•	52	•	69	•	75	•	95
47	•	51	•	61	•	93	•	82
49	•	57	•	65	•	69	•	75
47	•	59	•	56	•	63	•	62

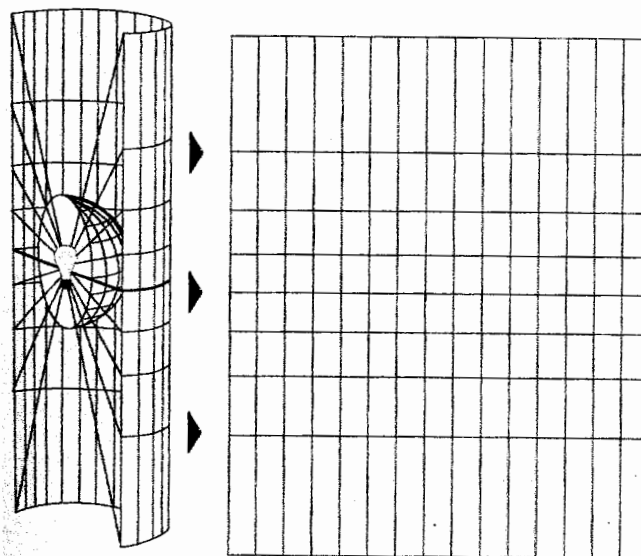
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- b) Complete the map by showing **all the necessary information** that a choropleth map ought to have. **(10 marks)**
- c) Assuming that you were a **campaign manager** of an aspiring member of parliament, which region would you spend your campaign resources on and why? **(4 marks)**
(30 marks)

QUESTION FIVE

- a) Define the phrase **map compilation** as used in cartography. **(2 marks)**
- b) Discuss briefly what geographical attribute data would be required for a **worksheet** to produce a map to reflect the number of orphan and vulnerable children (**OVC**) that are present in each administrative region of Swaziland. **(8 marks)**
- c) i. Name the cartographic technique illustrated in the following Figure. **(1 mark)**



- ii. State the three (3) categories of this cartographic technique. **(9 marks)**
- d) Discuss in detail the major **cartographic** and **geographical break through** that this technique brought to modern geography. **(10 marks)**
(30 marks)