UNIVERSITY OF SWAZILAND

DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND PLANNING

B. ED SEC II, B.SC. II, BA. Hum II, & BA. SOC. SC. II
FINAL EXAMINATION DECEMBER, 2008

TITLE OF PAPER : ELEMENTARY SURVEYING AND CARTOGRAPHY

COURSE NUMBER : GEP 213

TIME ALLOWED : THREE (3) HOURS

INSTRUCTIONS : ANSWER ANY THREE (3) QUESTIONS NCLUDING QUESTION ONE (1) WHICH IS COMPULSARY.

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

SECTION A: COMPULSORY

QUESTION 1

a) Figure 1 was drawn at a scale of 1:5000 in November and to reflect the topographic layout of a site identified for Goitse, a children's park in one of the Townships in Francistown, Botswana.
    i.   Which surveying technique was used to collect the data in Figure 1?   **(2 marks)**
    ii.   Name the basic cartographic features that were excluded in the map?   **(5 marks)**
    iii.   Which statement of scale was used in this map?   **(2 marks)**

b) Calculate the slope between V and W.   **(10 marks)**

c) The grid spacing between stations was 5.0 m, and the grid was 30 m x 25 m. A section of **some parts** of the processed data collected at the site is shown on Table 1.

Table 1. Contouring survey results of the proposed children's Park, Francistown, Botswana

Spot	Reduced Level (RL) (m)	NO. of Times RL is used (N)	RL x N (m)
A1	46	1	46
B1	54	2	108
Total		120	130

    i.   Assuming a 40.0 m formation depth, calculate the mean height using equation 1.

$$\text{Mean Height} = \frac{\Sum(RLxN)}{\Sum N} \qquad\qquad (1)$$

    ii.   Calculate the excavation depth.   **(6 marks)**

    iii.   Calculate the volume of excavation using the spot height method.   **(10 marks)**

d) Is the topographic layout of the site as reflected in Figure 1 suitable for a children's park, give reasons why?   **(5 marks)**

                                        (40 marks)

SECTION B: ANSWER ANY TWO QUESTIONS
QUESTION 2

a) What are the two methods of slope measurements besides an abney level?   **(4 marks)**

b) An gully was increasing at a rate of 30.0 mm per month on average, a Land Use Planner used an abney level to measurement its depth. During measurement the abney level recorded an angle of elevation from the horizontal plane of sight as 20^0. The survey station was 30.0 m away from the gully and the surveyor's eyesight height was 1.6 m.
    i.   Compute the depth of the gully.   **(10 marks)**
    ii..   How long did the gully take to reach this depth?   **(16 marks)**
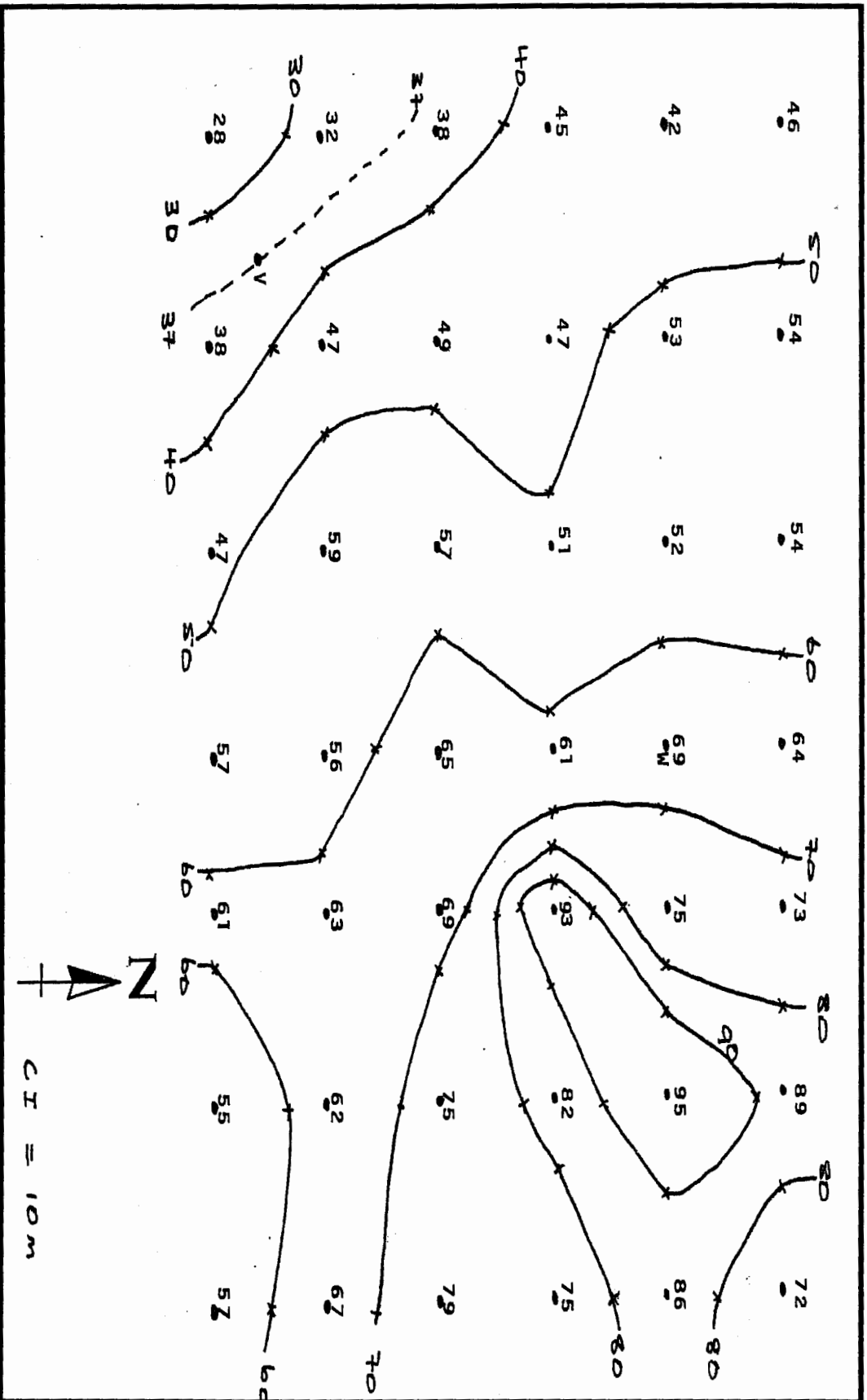   **(30 marks)**

Examination N0:

Figure 1. Contour map of the proposed Goitse Park

QUESTION 3

a) i.   Name any two methods that could be used to compute areas from maps other than the grid method.   **(2 marks)**

    ii. State two limitations of the grid method as a means of area estimation.   **(6 marks)**

b) i.   An area identified for a town development project on a map of scale 1:50 000 was estimated using a 1 cm^2 grid as 20.0 cm^2. Compute the true area of the development site in square meters and hectares.   **(2 marks)**

    ii. Describe in detail how you could use the grid method to estimate the area of a given development site shown on a scaled map.   **(10 marks)**

c) i.   Define the phrase **map compilation** as used in cartography.   **(2 marks)**

    ii. Discuss briefly what geographical attribute data would be required for a **worksheet** to produce a map to reflect the number of people who voted during the 2008 elections in all the administrative regions of Swaziland.   **(8 marks)**

                                                                                    (30 marks)

QUESTION 4

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

b) What are the two methods that are used for booking levelling data?   **(4 marks)**

c) Book the data shown in Figure 2 using Table 2, assuming that it was collected on 15 December, 2006. Carryout all the booking requirements that are recorded in the field book during data collection including the arithmetic checks performed later in the office.

                                                                                    (20 marks)

                                                                                    (30 marks)

QUESTION 5

a) Discuss in detail the role of lettering in modern cartography.   **(10 marks)**

b) Use the appropriate free hand lettering and symbols or even shading where necessary to complete the ecological zone map of Swaziland shown on Figure 3. Figure 4 may be used as a source for this exercise.   **(20 marks)**
                                                                                    (30marks)

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

| 0.45 (BS) | 1.72 (IS) | 1.85 (IS) | 1.98 (IS) | 2.09 (FS) |

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

| 1.45 (BS) | 1.68 (IS) | 1.855 (IS) | 2.04 (IS) | 1.555 (FS) |

Height of collimation = 731.09m + (1.555-0.965m) = 731.680m

| 0.965 (BS) | 1.205 (IS) | 1.495 (IS) | 1.775 (IS) | 2.03 (IS) | 2.15 (IS) | 2.05 (FS) |

730.00m

P

R

0.64

0.19
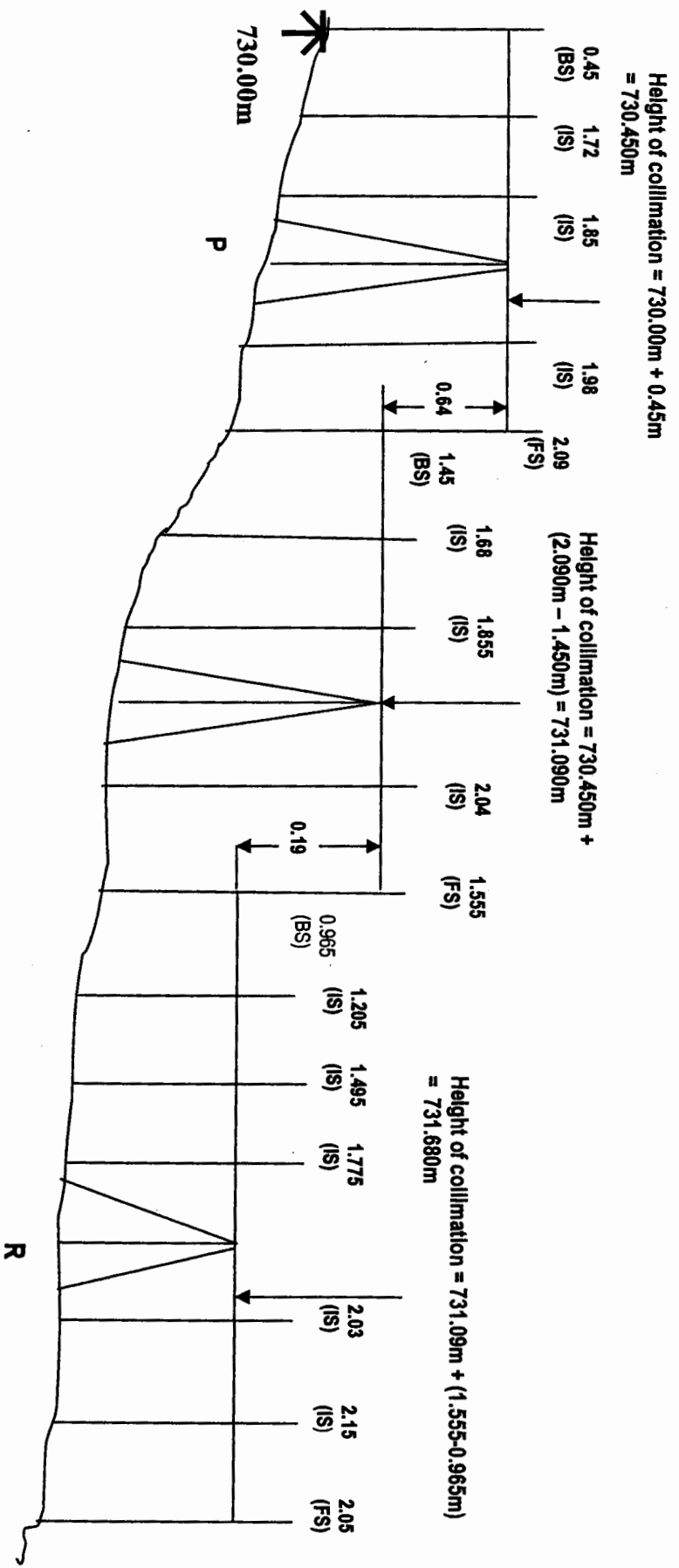
Figure.2. Road section between Cardiff Hall and the Education Centre, UNISWA, Luyengo Swaziland.

Examination N0:..

Table 2.. ....

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

....

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

Weather: ....

Back Sight	Intermediates	Fore Sight	Rise	Fall	Reduced Level	Distance (m)	Remarks