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, 2007

B.Sc. 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.

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

SECTION I: COMPULSORY

QUESTION ONE

A) Figure 1 on the following page was drawn at a scale of 1:1000 in November, 2000 using chain surveying data of Viewfield Industrial Estate in Dumbarton, England collected by Mr. D.W. Pemberton on 23 rd April, 1993.

    i. Complete the map (Figure 2) by including all the necessary information that a map should have. **(20 marks)**

    ii. Which statement of scale was used in this map? **(2 marks)**

    iii. Why should chain lines be excluded in such maps? **(2 marks)**

    iv. Compute the area of the factory using any method known to you. **(6 marks)**

B) Using the cartographic techniques presented in Figure 2 below:

    i. Name the cartographic technique illustrated. **(3 marks)**

    ii. State the three (3) categories of this cartographic technique. **(6 marks)**

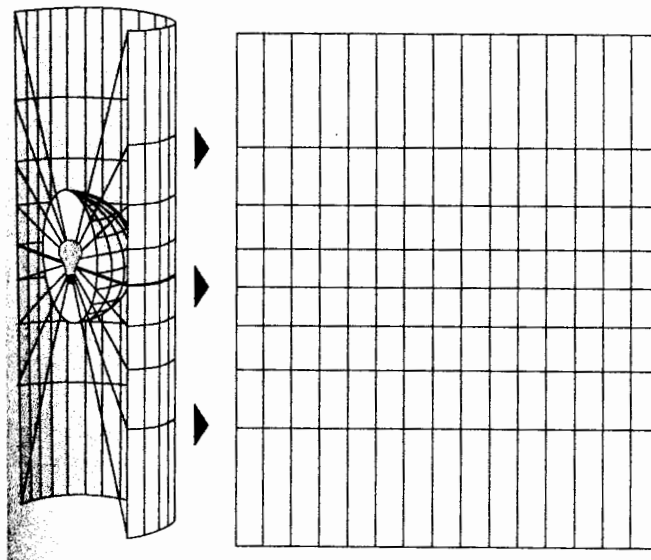   iii. What is the name of the projection that is used in Swaziland? **(1 mark)**

Figure 2. Cartographic map making technique illustration

    iii. State the three (3) categories of this cartographic technique. **(6 marks)**

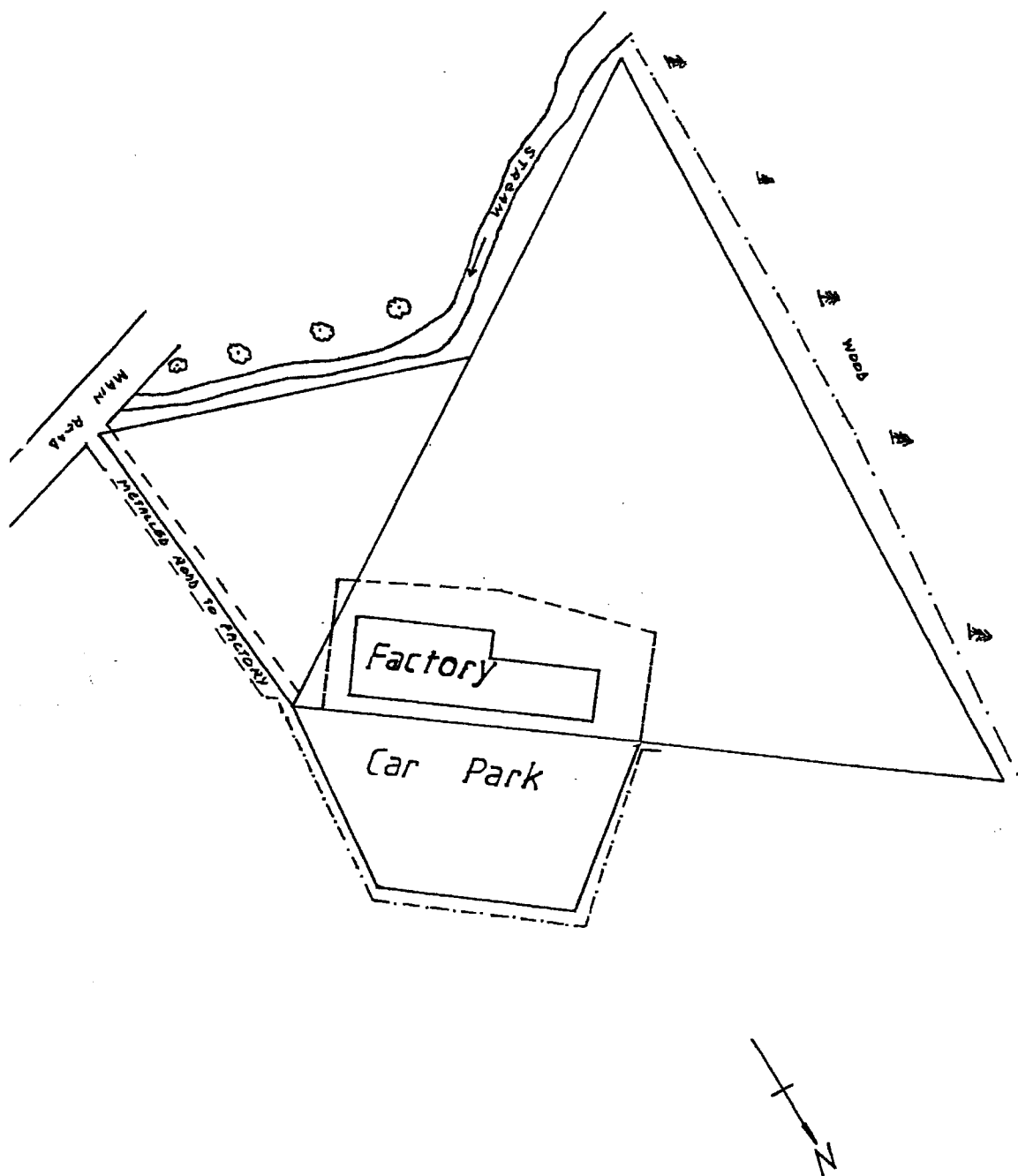   iii. What is the name of the projection that is used in Swaziland? **(1 mark)**

Figure 1. Chain Surveying Map

## SECTION B: ANSWER ANY TWO QUESTIONS

QUESTION 2

a)   Explain the methods of slope measurements other than an abney level?   **(8 marks)**

b)   In an attempt to accurately measure the depth of a gully, which was increasing at a rate of 30.0 mm per month on average, a Land Use Planner, used an abney level for measurement. The abney level recorded the angle of elevation from the horizontal plane of sight as 20^0. The distance between the survey station and the gully was found to be 30.0 m, while the Land Use Planner's eyesight height measured 1.6 m.

   i.   Compute the depth of the gully.   **(10 marks)**

   ii..   If the Land Use Planner wanted to apply stabilisation measures to the gully at a depth of 13.0 m, where there was an impending layer, how long would he have to wait for the gully to reach this depth?   **(12 marks)**

QUESTION 3

a)   State the instruments or techniques that are used in direct distance measurements as well as in optical distance measurements.   **(5 marks)**

b)   Describe how the electromagnetic distance measurement instruments operate.   **(10 marks)**

c)   Discuss the role of surveying and cartography as an elementary course as well as its applications in your future professional lives.
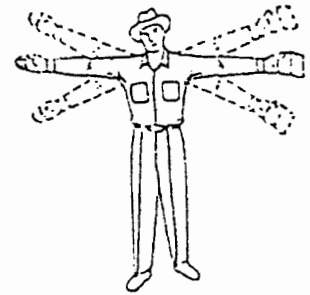
      (15 marks)

QUESTION 4

a)   Briefly discuss the role of signals and symbols in surveying and cartography?   **(10 marks)**

b)   State the meaning of the signals and symbols shown in Figure 3 as used in surveying and cartography.   **(20 marks)**
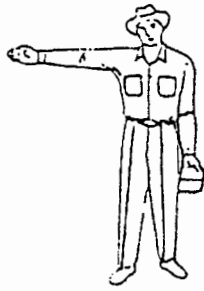
i. ....

ii. ....

iii. ....

iv. ....

v. ....

vi. ....

vii. ....

viii. ....
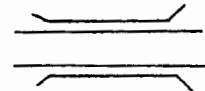
ix. ....

x. ....

(10 marks)

Figure 3. Common surveying and cartographic signals and symbols.

QUESTION 5

A)   Name any three (3) methods of computing areas from maps other than the Simpson's and Trapezoidal's Rules.   **(3 marks)**

B)   Using the chain surveying data in Table 1 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.
                                                                                                                        (12 marks)

Table 1. Embankment chaining field data.

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

C)   i. List any five (5) main chain surveying equipment other than the tape measure.   **(5 marks)**

      ii. Describe, with the aid of a diagram how you could measure offsets in chain surveying using a tape measure.   **(10 marks)**