UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER -   MAY 2005
B.SC., B.A. B.A.S.S AND B.ED

Title: STATISTICAL GEOGRAPHY

Course Number: GEP 223

Time Allowed: Three (3) Hours

Instructions: 1. Answer Three (3) Questions.
                              2. Question One (1) is compulsory
                              3. Choose Two (2) other questions from Section B.
                              4. Where appropriate, illustrate your answer with examples.
                              5. All working and/or calculations must be clearly shown.
                              6. You will be provided with graph papers and tables for critical values and significant levels.

Marks Allocation: Question One carries Forty (40) marks and the other Questions are Thirty (30) marks each.

This paper is not to be opened until permission has been granted by the Invigilator.

SECTION A: COMPULSORY SECTION

QUESTION 1
Table I indicates some hypothetical figures on water holding capacity for two sites in Usutu forest. The null hypothesis (H_o) states that there is no real difference in the water holding capacity between the two sites. If there is any difference, then this might be due to the way the random samples of the soils have been taken. The alternative hypothesis (H_1) states that site A actually has higher water holding capacity than site B. The significance level has been set at 0.05.

(a) Let us assume the sample values given in Table 1 are from two independent variables X (site A) and Y (site B). Apply a student's t-test for independent samples to determine whether you should reject the H_o in favour of H_1. **(15 marks)**

(b) Again, let us assume the same sample values given in Table I, X for site A and Y for site B are paired. Apply the student's t-test for paired samples to determine whether you should reject or accept the H_o in favour of H_1. **(15 marks)**

(c) Comment on the answers obtained in (a) and (b) above. **(5 marks)**

(d) Identify the situations in which the student's t-test statistic can be used. **(5 marks)**

SECTION B: ANSWER ANY TWO (2) QUESTIONS

QUESTION 2
Figure I shows the location of farming homesteads. It also shows the location of the Inkhundla centre.

(a) Calculate the centre of minimum travel among the homesteads whose farmers grow vegetables. **(20 marks)**

(b)   Based on the result obtained in (a) above, comment on the appropriateness of the location of the Inkhundla centre as a central service point to the farmers growing vegetables in the area.

(10 marks)

QUESTION 3

(a)   The data matrix provided in Table II indicate values for a number of variables. Using the data, calculate the mode, median and mean of the following:

   (i)   Family planning expenditure (variable E),
   (ii)   Child Centre expenditure (variable D), and
   (iii)   Percentage of working males in Social classes I and II
            (variable B).   **(18 marks)**

(b)   Discuss the implication of using the mode, median and mean as measures of central tendency.   **(9 marks)**

(c)   Identify the advantages and limitations of these measures (mode, median and mean) about the "average" expenditure.   **(3 marks)**

QUESTION 4

(a)   Identify four 94) main sampling techniques.   **(4 marks)**

(b)   Using examples and diagrams, demonstrate how each of the sampling techniques can be used.   **(26 marks)**

QUESTION 5

You have been asked to establish as to whether the differences in soil types in the Middle Veld have any influence on the type of vegetation prevailing in the veld. You have limitations of finance and time. Demonstrate how you will go about carrying out such a study.   **(30 marks)**
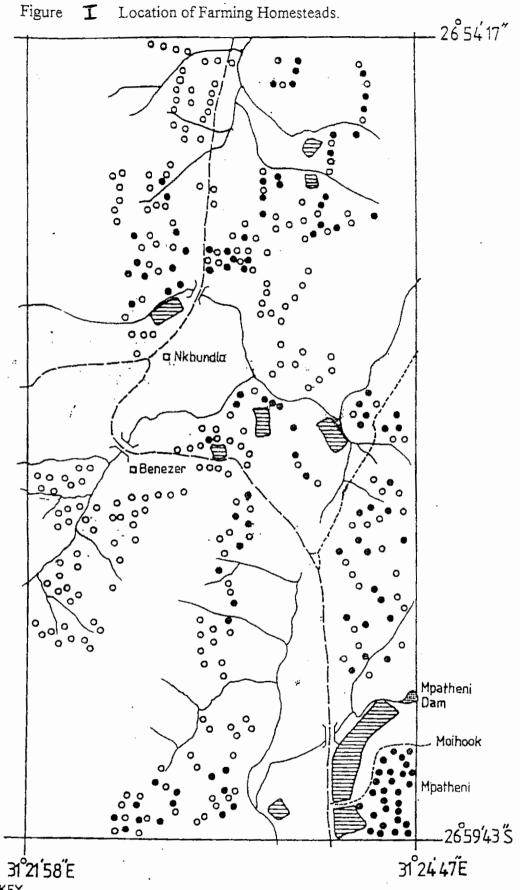
Table I: Water Holding Capacity (in Mbar) In Usuthu Forest

Samples from Site A (variable x)	Samples from Site B (variable y)
91	82
72	80
62	99
85	20
71	25
86	54
58	50
29	46
45	70
101	58
88	102
61	.44
83	76
74	55
80	60

Source: Hypothetical

Figure I Location of Farming Homesteads.

26°54'17"

Nkhundla

Benezer

Mpatheni Dam

Moihook

Mpatheni

26°59'43"S

31°21'58"E

31°24'47"E

KEY

• Farmers growing vegetables
o Farmers not growing vegetables
⊟ Gardens
— — Main road
〰 Rivers
▨ Dam

Table II: Data Matrix

		VARIABLES				
Individuals	A	B	C	D	E	F
1. Basildon	20.38	8.3	***	***	***	1.06
2. Birkenhead	12.70	6.9	5.5	8.14	1.96	0.68
3. Birmingham	12.70	7.8	10.7	2.34	0.00	0.64
4. Blackpool	19.56	11.9	5.5	3.96	0.00	0.45
5. Bolton	14.14	7.5	8.0	3.12	0.00	0.53
6. Bournemouth	23.85	14.1	10.0	2.76	3.62	0.97
7. Bradford	13.67	8.9	11.9	6.78	0.00	0.41
8. Brighton	20.33	11.4	9.9	3.69	0.00	0.61
9. Bristol	14.13	7.9	10.0	10.60	28.40	0.99
10. Cardiff	13.36	9.9	6.8	5.57	37.73	0.85
11. Coventry	9.46	6.4	6.5	3.09	4.41	0.74
12. Derby	13.71	5.1	7.1	1.19	0.00	0.59
13. Dudley	10.24	7.4	4.3	3.49	0.00	0.72
14. Gateshead	12.78	6.0	10.1	3.56	0.00	0.51
15. Huddersfield	13.95	10.1	7.2	1.58	0.00	0.54
16. Hull	12.20	7.2	6.6	2.20	47.59	0.29
17. Ipswich	13.38	7.6	6.0	4.20	67.76	0.59
18. Leeds	13.65	9.3	9.1	2.94	5.88	0.45
19. Leicester	13.72	8.8	9.2	1.10	0.00	0.61
20. Liverpool	14.06	7.5	8.1	1.10	26.94	0.45
21. London	12.97	14.7	9.2	5.15	10.17	0.92
22. Luton	9.42	6.9	4.3	1.87	18.60	0.74
23. Manchester	14.05	6.9	13.0	3.05	16.06	0.41
24. Newcastle	15.75	7.7	14.4	3.46	0.00	0.34
25. Newport	11.85	7.7	6.2	3.83	8.11	0.66

Source: Ebdon, 1977, p. 191 Appendix E.

■ Critical Values of Student's t

| | Significance level (one-tailed) | | | | |
Degrees of freedom	0.05	0.025	0.01	0.005	0.0005
	Significance level (two-tailed)				
	0.1	0.05	0.02	0.01	0.001
1	6.31	12.71	31.82	63.66	636.62
2	2.92	4.30	6.97	9.93	31.60
3	2.35	3.18	4.54	5.84	12.92
4	2.13	2.78	3.75	4.60	8.61
5	2.01	2.57	3.37	4.03	6.86
6	1.94	2.45	3.14	3.71	5.96
7	1.89	2.37	3.00	3.50	5.41
8	1.86	2.31	2.90	3.35	5.04
9	1.83	2.26	2.82	3.25	4.78
10	1.81	2.23	2.76	3.17	4.59
11	1.80	2.20	2.72	3.11	4.44
12	1.78	2.18	2.68	3.05	4.32
13	1.77	2.16	2.65	3.01	4.22
14	1.76	2.15	2.62	2.98	4.14
15	1.75	2.13	2.60	2.95	4.07
16	1.75	2.12	2.58	2.92	4.01
17	1.74	2.11	2.57	2.90	3.97
18	1.73	2.10	2.55	2.88	3.92
19	1.73	2.09	2.54	2.86	3.88
20	1.73	2.09	2.53	2.85	3.85
21	1.72	2.08	2.52	2.83	3.82
22	1.72	2.07	2.51	2.82	3.79
23	1.71	2.07	2.50	2.81	3.77
24	1.71	2.06	2.49	2.80	3.75
25	1.71	2.06	2.49	2.79	3.73
26	1.71	2.06	2.48	2.78	3.71
27	1.70	2.05	2.47	2.77	3.69
28	1.70	2.05	2.47	2.76	3.67
29	1.70	2.05	2.46	2.76	3.66
30	1.70	2.04	2.46	2.75	3.65
40	1.68	2.02	2.42	2.70	3.55
60	1.67	2.00	2.39	2.66	3.46
120	1.66	1.98	2.36	2.62	3.37
∞	1.65	1.96	2.33	2.58	3.29