UNIVERSITY OF SWAZILAND

DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND PLANNING

FINAL EXAMINATION PAPER – MAY, 2010

B.A., B.A.S.S., B. Ed., B. Sc.

TITLE OF PAPER: STATISTICAL GEOGRAPHY

COURSE NUMBER: GEP 223

TIME ALLOWED: THREE (3) HOURS

INSTRUCTIONS:
1. ANSWER THREE (3) QUESTIONS.
2. QUESTION 1 IS COMPULSORY.
3. CHOOSE TWO (2) QUESTIONS FROM SECTION B.
4. WHERE APPROPRIATE, ILLUSTRATE YOUR ANSWERS BY 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 SIGNIFICANCE LEVELS.

MARK ALLOCATION: QUESTION ONE (1) CARRIES FORTY (40) MARKS AND THE OTHER QUESTIONS ARE THIRTY (30) MARKS EACH.

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GEP 223: STATISTICAL GEOGRAPHY – MAY, 2010

SECTION A: COMPULSORY QUESTION

QUESTION 1

Figure 1 shows the location of farming homesteads and the Inkhundla centre.

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

(30 marks)

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

(10 marks)

[40 Marks]

SECTION B: ANSWER ANY TWO QUESTIONS

QUESTION 2

Table 1 indicates some hypothetical figures on water holding capacity for two sites (A and B) in a forest. The null hypothesis (H_0) is that there is no real difference in the water holding capacity between the two sites. The alternative hypothesis (H_1) states that site A actually has a higher water holding capacity than site B. The significance level is set at 0.05. Apply a student's t-test for independent samples to determine whether you should reject the H_0 in favour of the H_1.

[30 marks]

Table 1: Water holding capacity (in mbar)

Samples from site A (variable x)	Samples from site B (variable y)
82	46
68	46
52	40
95	58
91	53
74	25
81	54
78	70
74	41
83	59
62	72

Source: Hypothetical

QUESTION 3

An equal number of three fish species A, B, and C were introduced in a pond to breed. The H_0 was that all fish species will yield an equal proportion of fish. The H_1 was that the three different fish species will actually yield different numbers of fish. During harvesting, a sample of 1, 200 fish was caught randomly. Among these, 360 were specie A, 372 specie B and 468 specie C. Use the Chi-Square Test to establish whether the number of the different fish species caught is compatible with the H_0.

[30 Marks]

QUESTION 4

A consultant commissioned to study industrial investments in Swaziland selected only the large scale industries located in Matsapha industrial complex.

(a) Discuss whether this is a representative sample of the industries in Swaziland.

(10 marks)

(b) If you were employed to undertake this study:

(i) Discuss how you will do the study.

(8 marks)

(ii) Indicate the sampling technique you would use.

(2 marks)

(iii) Explain how you will apply the selected sampling technique.

(10 marks)

[30 marks]

QUESTION 5

Using the data in Table 2 do the following:

(a) Draw a scatter plot of the data.

(10 marks)

(b) Compute the Pearson's Correlation Coefficient (r).

(15 marks)

(c) Interpret the value of r obtained in (b) above.

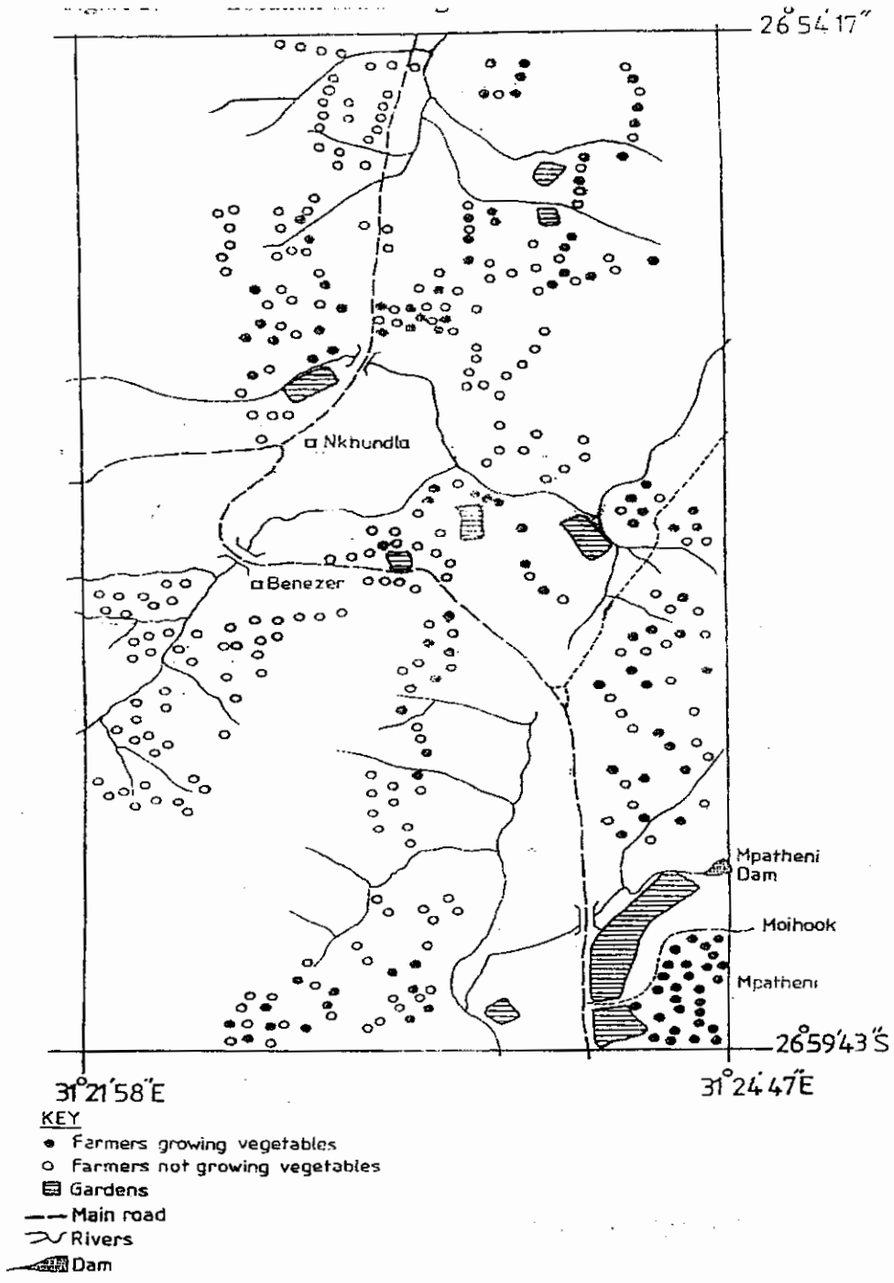
(5 marks)

[30 marks]

Table 2: Latitude and Temperature Range in ^{0}C for some stations in north and south of the equator

Station No.	Latitude (x)	Temperature Range (y)
1	32S	1.7
2	6S	3.3
3	21N	4.4
4	30S	7.2
5	10N	2.2
6	1S	0.2
7	19N	5.6
8	25N	17.2
9	37N	13.9
10	33N	6.7
11	34S	10.6
12	42N	25
13	39N	11.1
14	34S	8.3
15	56N	16.7
16	35S	11.7
17	78N	24.4
18	78S	22.2
19	30N	15

Figure 1: Location of Farming Homesteads and Nkhundla Centre



C5 Critical Values of Chi Square

Degrees of freedom	Significance level 0.1	0.05	0.01	0.005	0.001
1	2.71	3.84	6.64	7.88	10.83
2	4.60	5.99	9.21	10.60	13.82
3	6.25	7.82	11.34	12.84	16.27
4	7.78	9.49	13.28	14.86	18.46
5	9.24	11.07	15.09	16.75	20.52
6	10.64	12.59	16.81	18.55	22.46
7	12.02	14.07	18.48	20.28	24.32
8	13.36	15.51	20.09	21.96	26.12
9	14.68	16.92	21.67	23.59	27.88
10	15.99	18.31	23.21	25.19	29.59
11	17.28	19.68	24.72	26.76	31.26
12	18.55	21.03	26.22	28.30	32.91
13	19.81	22.36	27.69	30.82	34.53
14	21.06	23.68	29.14	31.32	36.12
15	22.31	25.00	30.58	32.80	37.70
16	23.54	26.30	32.00	34.27	39.29
17	24.77	27.59	33.41	35.72	40.75
18	25.99	28.87	34.80	37.16	42.31
19	27.20	30.14	36.19	38.58	43.82
20	28.41	31.41	37.57	40.00	45.32
21	29.62	32.67	38.93	41.40	46.80
22	30.81	33.92	40.29	42.80	48.27
23	32.01	35.17	41.64	44.18	49.73
24	33.20	36.42	42.98	45.56	51.18
25	34.38	37.65	44.31	46.93	52.62
26	35.56	35.88	45.64	48.29	54.05
27	36.74	40.11	46.96	49.65	55.48
28	37.92	41.34	48.28	50.99	56.89
29	39.09	42.56	49.59	52.34	58.30
30	40.26	43.77	50.89	53.67	59.70
40	51.81	55.76	63.69	66.77	73.40
50	63.17	67.51	76.15	79.49	86.66
60	74.40	79.08	88.38	91.95	99.61
70	85.53	90.53	100.43	104.22	112.32
80	96.58	101.88	112.33	116.32	124.84
90	107.57	113.15	124.12	128.30	137.21
100	118.50	124.34	135.81	140.17	149.45

C4 Critical Values of Student's t

	Significance level (one-tailed)				
	0.05	0.025	0.01	0.005	0.0005
Degrees of freedom	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

C8 Critical Values of Pearson's Product-Moment Correlation Coefficient r

Degrees of freedom	Significance level (one-tailed) 0.05	0.025	0.01	0.005
	Significance level (two-tailed) 0.1	0.05	0.02	0.01
1	0.9877	0.9969	0.9995	0.9999
2	0.900	0.950	0.980	0.990
3	0.805	0.878	0.934	0.959
4	0.729	0.811	0.882	0.917
5	0.669	0.755	0.833	0.875
6	0.622	0.707	0.789	0.834
7	0.582	0.666	0.750	0.798
8	0.549	0.632	0.716	0.765
9	0.521	0.602	0.685	0.735
10	0.497	0.576	0.658	0.708
11	0.476	0.553	0.634	0.684
12	0.458	0.532	0.612	0.661
13	0.441	0.514	0.592	0.641
14	0.426	0.497	0.574	0.623
15	0.412	0.482	0.558	0.606
16	0.400	0.468	0.543	0.590
17	0.389	0.456	0.529	0.575
18	0.378	0.444	0.516	0.561
19	0.369	0.433	0.503	0.549
20	0.360	0.423	0.492	0.537
25	0.323	0.381	0.445	0.487
30	0.296	0.349	0.409	0.449
35	0.275	0.325	0.381	0.418
40	0.257	0.304	0.358	0.393
45	0.243	0.288	0.338	0.372
50	0.231	0.273	0.322	0.354
60	0.211	0.250	0.295	0.325
70	0.195	0.232	0.274	0.302
80	0.183	0.217	0.257	0.283
90	0.173	0.205	0.242	0.267
100	0.164	0.195	0.230	0.254

C6 Critical Values of H for the Kruskal–Wallis Test

n_1	n_2	n_3	Significance level 0.1	0.05	0.01	0.005
2	1	1				
2	2	1				
2	2	2	4.571			
3	1	1				
3	2	1	4.286			
3	2	2	4.500	4.714	5.357	
3	3	1	4.571	5.143		
3	3	2	4.556	5.361		
3	3	3	4.622	5.600	7.200	7.200
4	1	1				
4	2	1	4.500			
4	2	2	4.056	5.208		
4	3	2	4.511	5.444	6.444	
4	3	3	4.709	5.727	6.746	
4	4	1	4.167	4.967	6.667	
4	4	2	4.555	5.455	7.036	
4	4	3	4.546	5.599	7.144	
4	4	4	4.654	5.692	7.654	
5	1	1				
5	2	1	4.200	5.000		
5	2	2	4.373	5.160	6.533	
5	3	1	4.018	4.960		
5	3	2	4.651	5.251	6.882	
5	3	3	4.533	5.649	7.079	
5	4	1	3.987	4.986	6.955	
5	4	2	4.541	5.268	7.118	
5	4	3	4.549	5.631	7.445	
5	4	4	4.619	5.618	7.760	
5	5	1	4.109	5.127	7.309	
5	5	2	4.508	5.339	7.269	
5	5	3	4.545	5.706	7.543	
5	5	4	4.523	5.643	7.791	
5	5	5	4.560	5.780	7.980	