

**UNIVERSITY OF SWAZILAND**

**SUPPLEMENTARY EXAMINATION PAPER JULY 2008**

**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 1 IS COMPULSORY
  3. CHOOSE TWO (2) OTHER 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 SIGNIFICANT LEVELS.

MARK ALLOCATION : QUESTION ONE (1) 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 1 shows data on the population, Gross National Product (GNP), and life expectancy of some selected high and low income countries. Using the data, do the following:

- (a) Plot a scatter diagram for the GNP and the life expectancy. (5 marks)
- (b) Comment on the diagram in (a) above (5 marks)
- (c) Calculate the Product Moment Correlation and the Spearman Rank Correlation Coefficients for the data. (20 marks)
- (d) Test the correlation coefficient at 0.05 level of significance. (5 marks)
- (e) Comment on the Spearman's Rank Correlation and the Product Moment Correlation Coefficient as methods of identifying relationships. (5 marks)

**(40 marks)**

**Table 1 Size of Population and GNP Per Capita for some selected high and low income countries**

<b>Country</b>	<b>Population (Millions)</b>	<b>GNP Per capita</b>	<b>Life Expectancy</b>
Mozambique	15.5	90	46
Ethiopia	54.9	100	49
Tanzania	28.8	140	51
Burundi	6.2	160	50
Sierra Leone	4.4	160	40
Malawi	9.5	170	44
Bolivia	7.2	770	60
Indonesia	190.4	880	63
Philippines	67.0	950	65
Bulgaria	8.4	1250	71
Romania	22.7	1270	70
Algeria	27.4	1650	69
Portugal	159.1	2970	67
New Zealand	40.5	3040	64
United Kingdom	1.3	3880	70
Canada	88.5	4180	71
United States	2.1	5140	70
Norway	34.2	8110	72
Kenya	26.0	250	52
Nigeria	108	280	53

**Source:** Adapted from World Development Report, 1996

## SECTION B: ANSWER ANY TWO (2) QUESTIONS

### QUESTION 2

- (a) Outline the functions of statistical techniques in geography. (10 marks)
- (b) Explain the main steps involved in the scientific approach in analyzing geographical problems. (12 marks)
- (c) Indicate situations where you can use the following statistics: ( 8 marks )
- (i) Spearman Rank Correlation Coefficient
  - (ii) Standard deviation
  - (iii) The student t-test
  - (iv) The Chi-Square test
- (30 marks)

### QUESTION 3

Table 2 shows hypothetical scores for a sample of students from four (4) different high schools in the Lubombo district. The  $H_0$  states that there is no difference in the scores obtained by the students from the four high schools. The  $H_1$  states that there is actually a difference in the scores obtained by the students in the four high schools. Apply the Kruskal-Wallis test to establish whether the  $H_0$  can be rejected at 0.01 significance level.

**Table 2 Hypothetical scores for sampled students of three High schools**

Lomahasha	Lubombo	Lusoti	Big Bend
110	123	099	098
114	103	106	086
112	109	115	106
120	117	118	112
102	114	096	110
098	133	098	
108			

Source: Hypothetical

(30 marks)

### QUESTION 4

Figure 1 shows the distribution of sampled Tinkhundla centres in Swaziland.

- (a) Calculate the Nearest Neighbour Index for the Tinkhundla centres in Swaziland.

(20 marks)

- (b) Explain the situations under which the Nearest Neighbour Index statistic can be used.  
(10 marks)

**(30 marks)**

### **QUESTION 5**

The Ministry of Enterprise and Employment is undertaking a study to determine the nature of industrial investment in the country, that is, small, medium and large scale industries. In the process of undertaking the study, the Ministry wants to employ sampling techniques but they only chose industries in the Ngwenya Industrial estate.

- (a) Explain why this is not a representative sample of industries in the country.

(10 marks)

- (b) If you were employed to undertake this study discuss, how you would go about conducting it and what sampling technique you would use in carrying it out.

(20 marks)

**(30 marks)**

**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 <sub>1</sub>	n <sub>2</sub>	n <sub>3</sub>	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	

**C9 Critical Values of Spearman's Rank Correlation Coefficient  $r_s$**

Degrees of freedom	Significance level (one-tailed)			
	0.05	0.025	0.01	0.005
Degrees of freedom	Significance level (two-tailed)			
	0.1	0.05	0.02	0.01
4	1.000			
5	0.900	1.000	1.000	
6	0.829	0.886	0.943	1.000
7	0.714	0.786	0.893	0.929
8	0.643	0.738	0.833	0.881
9	0.600	0.683	0.783	0.833
10	0.564	0.648	0.745	0.794
11	0.523	0.623	0.736	0.818
12	0.497	0.591	0.703	0.780
13	0.475	0.566	0.673	0.745
14	0.457	0.545	0.646	0.716
15	0.441	0.525	0.623	0.689
16	0.425	0.507	0.601	0.666
17	0.412	0.490	0.582	0.645
18	0.399	0.476	0.564	0.625
19	0.388	0.462	0.549	0.608
20	0.377	0.450	0.534	0.591
21	0.368	0.438	0.521	0.576
22	0.359	0.428	0.508	0.562
23	0.351	0.418	0.496	0.549
24	0.343	0.409	0.485	0.537
25	0.336	0.400	0.475	0.526
26	0.329	0.392	0.465	0.515
27	0.323	0.385	0.456	0.505
28	0.317	0.377	0.448	0.496
29	0.311	0.370	0.440	0.487
30	0.305	0.364	0.432	0.478
35	0.282	0.336	0.399	0.442
40	0.263	0.314	0.373	0.413
45	0.248	0.296	0.351	0.388
50	0.235	0.280	0.332	0.368
55	0.224	0.267	0.317	0.351
60	0.214	0.255	0.303	0.335
65	0.206	0.245	0.291	0.322
70	0.198	0.236	0.280	0.310
75	0.191	0.228	0.271	0.300
80	0.185	0.221	0.262	0.290
85	0.180	0.214	0.254	0.281
90	0.174	0.208	0.247	0.273
95	0.170	0.202	0.240	0.266
100	0.165	0.197	0.234	0.259