UNIVERSITY OF SWAZILAND

DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND PLANNING

SUPPLEMEENTARY EXAMINATION PAPER JULY 2015

B.SC., B.A., BASS and B.ED

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) OTHER QUESTIONS FROM SECTION B.
4. WHERE APPROPRIATE ILLUSTRATE YOUR ANSWERS WITH EXAMPLES

ALLOCATION OF MARKS: QUESTION ONE (1) CARRIES 40 MARKS WHILE THE REST CARRY 30 MARKS EACH

THIS PAPER SHOULD NOT BE OPENED UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR

GEP 223: STATISTICAL GEOGRAPHY (SUPPLEMENTARY) JULY 2015

SECTION A: COMPULSORY

QUESTION 1

Table 1 shows hypothetical potato yields from different farm sizes of some households in Maliyaduma area.

a) Calculate the Spearman's Rank Correlation coefficient between potato yields and size of the farms. (20 marks)

b) Plot a scatter diagram and a regression line of the distribution of households in relation to their farm sizes and potato yields obtained. Assume that farm size is the independent variable. (10 marks)

c) Test the correlation at 0.05 significance level. (10 marks)

(40 Marks)

SECTION B: ANSWER ANY TWO QUESTIONS

QUESTION 2

Table 2 shows hypothetical scores for a sample of students from three (3) different high schools in the Lubombo district. The Null hypothesis (H_o) states that: There is no difference in the scores obtained by the students from the three high schools. The Alternative hypothesis (H_1) states that there is actually a difference in the scores obtained by the students in the three high schools. Apply the Kruskal-Wallis test to establish whether the H_o can be rejected at 0.01 significance level in favour of H_1.

(30 Marks)

QUESTION 3

a) Identify the main sources of information generally available to a geographer conducting quantitative research.

(10 marks)

b) With reference to the situation in developing countries, discuss the availability and quality of the sources identified in (a) above. (20 marks)

(30 Marks)

QUESTION 4

a) Define the measures of skewness. (5 marks)

b) Calculate the skewness coefficient of 4, 5, 5, 6, 6, 7, 7, 8 (20 marks)

c) Explain the meaning of the skewness measure obtained in (b) above (5 marks)

(30 Marks)

QUESTION 5

a) Outline the functions of statistical techniques in Human Geography. (10 marks)

b) Explain the main steps involved in the scientific approach to analysing geographical problems. (12 marks)

c) Indicate instances where you can use the following statistics:

(i) Students t-test (2 marks)

(ii) Regressional analysis (2 marks)

(iii) Pearson Correlation Co-efficient (2 marks)

(iv) Chi-square test (2 marks)

(30 Marks)

Table 1 Distribution of potato yields and farm sizes of some households in Maliyaduma

Household No.	Potato yields	Farm size in ha
1.	80	121
2.	29	68
3.	61	49
4.	92	154
5.	01	62
6.	42	62
7.	88	140
8.	23	30
9.	74	88
10.	67	67
11.	88	12
12.	19	10
13.	15	28
14.	76	134
15.	87	20
16.	16	90
17.	48	06
18.	10	19
19.	12	51
20.	10	67

Source: Hypothetical

Table 2 Hypothetical scores for sampled students of three high schools

Siteki Nazarene	Simunye High	Lomahasha High
98	81	84
87	76	89
99	94	91
88	77	85
79	84	88

Source: Hypothetical

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
	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

Reject H_0 if calculated value of r_s is **greater than** the critical value at the chosen significance level (in absolute terms).

For degrees of freedom greater than 30 other critical values can be found from the following relationship:

$$r_s = z\sqrt{1/(n-1)}$$

where r_s is the critical value of r_s, n is the number of individuals in the data set (the degrees of freedom), and z is the appropriate critical value of a standard normal deviate (from Appendix C10). For a two-tailed test at the 0.01 level the appropriate value of z is 2.576, so the critical value of r_s with 72 degrees of freedom is:

$$2.576\sqrt{1/(72-1)} = 2.576\sqrt{0.014}$$
$$= 2.576 \times 0.119$$
$$= 0.306$$

C10 Critical Values of a Standard Normal Deviate z

	Significance level (one-tailed) 0.1	0.05	0.01	0.005	0.001
z	1.282	1.645	2.326	2.576	3.090
−z	−1.282	−1.645	−2.326	−2.576	−3.090
	Significance level (two-tailed) 0.1	0.05	0.01	0.005	0.001
z	1.645	1.960	2.576	2.813	3.291
−z	−1.645	−1.960	−2.576	−2.813	−3.291

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	

Reject H_0 if calculated value of H is greater than or equal to critical value at chosen significance level.