

**DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND
PLANNING**

FINAL EXAMINATION PAPER MAY 2016

B.SC., B.A., BASS & 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) QUESTIONS FROM SECTION B**
- 4. WHERE APPROPRIATE ILLUSTRATE YOUR ANSWERS WITH EXAMPLES**
- 5. ALL WORKING AND/OR CALCULATIONS MUST BE SHOWN**
- 6. YOU WILL BE PROVIDED WITH GRAPH PAPERS AND TABLES FOR CRITICAL VALUES AND SIGNIFICANT LEVELS.**

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

SECTION A: COMPULSORY**QUESTION 1**

Table 1 below shows data in a study of the relationship between the length of time that a person has been exposed to a high level of noise and the sound frequency range to which his or her ears will respond. Here x is the length of time (rounded to the nearest week) that a person has been living near a major airport directly in the flight path of departing jets, and y is his or her hearing range .

Table 1 Length of time exposed to sound frequency and hearing range

Number of weeks (x)	Hearing range (y)
47	15.1
56	14.1
116	13.2
178	12.7
19	14.6
75	13.8
160	11.9
31	14.8
12	15.3
164	12.6
43	14.7
74	14.0
80	13.8
95	14.1
108	12.8

a) Plot a scatter diagram of the data

(15 marks)

SECTION B: ANSWER ANY TWO QUESTIONS**QUESTION 2**

- (a) Define the measures of skewness. (9 marks)
- (b) Find the skewness of 5, 5, 6, 6, 7, 7, 7, 7, 8, 8 (21 marks)
- (30 Marks)**

QUESTION 3

The Swaziland Government has commissioned you to carry out a study of the 400 industries in Matsapa and evaluate their contribution to the national economic development of the country. Two hundred (200) of the industries are small scale, 150 are medium scale and 50 are large scale. The available funds to carry out the study are sufficient to cover only 20% of all the industries.

- (a) Demonstrate clearly how you would choose a representative sample for this study. (15 marks)
- (b) (i) Indicate the type of information you will need for this study. (8 marks)
- (ii) Identify possible sources of relevant information (7 marks)
- (30 Marks)**

QUESTION 4

Table 2 below shows the caloric values of the fat content of meals served in three elementary schools. Using this data, perform an Analysis of Variance (ANOVA) among the three schools at 0.05 level of significance to test whether the differences in the caloric values among the samples are significant or not.

Table 2 Caloric value of meals in three Elementary schools

School 1:	127	143	142	117	140	146	141	148
School 2:	127	146	138	143	142	124	130	130

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) Briefly explain the problem for which each of the tests is appropriate for analysing data.
 - i) Chi-square test (2 marks)
 - ii) Regression analysis (2 marks)
 - iii) Pearson Correlation Co-efficient (2 marks)
 - iv) Analysis of Variance (ANOVA) (2 marks)
- (30 Marks)**

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TABLES OF CRITICAL VALUES 219

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

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:

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

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