

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

**FINAL EXAMINATION PAPER MAY 2017**

**B.SC., B.A., BASS & B.ED**

**TITLE OF PAPER: STATISTICAL GEOGRAPHY/STATISTICAL  
MEASURES AND ANALYSIS**

**COURSE NUMBER: GEP 223/224**

**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 GRPAH 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**

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

**GEP 223/224: STATISTICAL GEOGRAPHY/STATISTICAL MEASURES & ANALYSIS**

**MAY 2017**

**SECTION A: COMPULSORY**

**QUESTION 1**

Table 1 shows hypothetical potato yields from different farm sizes of some households in Mahlabathini area in the Shiselweni district.

- a) Calculate the Spearman's Rank Correlation coefficient between potato yields and size of farms. (15 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 the farm size is the independent variable. (10 marks)
  - c) Test the Pearson Correlation coefficient at 0.05 significance. (12 marks)
  - a) Interpret the value of  $r$ . (03 marks)
- (40 Marks)**

**SECTION B: ANSWER ANY TWO QUESTIONS**

**QUESTION 2**

Using relevant examples, explain how the following procedures and data types differ from each other:

- a) Parametric and non-parametric tests (6 marks)
- b) Probability and non-probability sampling (6 marks)
- c) Primary and secondary data (6 marks)
- d) Grouped and ungrouped data (6 marks)
- e) Nominal and Ordinal data (6 marks)

**(30 Marks)**

**QUESTION 3**

Table 2 shows the ages of sampled heads of households at Ngwane Park, a township of Manzini urban area and Mkhulamini, a rural area in the Manzini district. The Null ( $H_0$ ) hypothesis was

stated as: There is no difference between the mean ages of the urban and rural settlement household heads. The alternative hypothesis ( $H_1$ ) states that: There is a difference between the mean ages of the urban and rural settlement household heads. The significant level was set at 0.05.

- a) Calculate the Students' t-test to establish the difference between the two samples  
(25 marks)
  - b) Establish whether you would accept or reject ( $H_0$ ) based on the results in (a)  
(05 marks)
- (30 Marks)**

#### QUESTION 4

Identify three main sampling techniques and explain how each one of them is applied.

**(30 Marks)**

#### QUESTION 5

The Ministry of Education has commissioned consultants to undertake a survey aimed at determining the relationship between age and weight of students in high schools in Swaziland. Due to financial constraints, the Ministry is unable to cover all the schools in the country, thus covering only ten (10) schools in the Hhohho district.

- a) Justify why this is not a representative sample of high schools in the country  
(09 marks)
- b) With data provided in table 3 which shows the age and weight of students from Fundukuwela High School, one of the selected schools in the Hhohho district, calculate the Spearman's Rank Correlation coefficient  
(21 marks)

**(30 Marks)**

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

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 Ages of sampled heads of households at Ngwane Park and Mkhulamini**

Ngwane Park (x)	Mkhulamini (y)
57	38
43	37
38	46
49	43
47	33
53	34
59	41
49	45
38	40
59	32

Source: Hypothetical

**Table 3 Age and weight of students from Nkhaba High School**

<b>Student No.</b>	<b>Age</b>	<b>Weight</b>
1.	18	64
2.	17	60
3.	20	68
4.	17	61
5.	19	66
6.	16	63
7.	14	58
8.	19	65
9.	13	54
10.	15	60
11.	18	64
12.	11	52
13.	17	58
14.	18	60
15.	15	57

Source: Hypothetical

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

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

#### C4 Critical Values of Student's t

Degrees of freedom	Significance level (one-tailed)				
	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
$\infty$	1.65	1.96	2.33	2.58	3.29

Reject  $H_0$  if calculated value of  $t$  is **greater than** critical value at chosen significance level.