UNIVERSITY OF ESWATINI

DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND PLANNING

MAIN EXAMINATION PAPER MAY/JUNE 2019

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

TITLE OF PAPER: STATISTICAL MEASURES AND ANALYSIS

COURSE NUMBER: GEP 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 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

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

GEP 224: STATISTICAL MEASURES & ANALYSIS

MAIN EXAMINATION MAY 2019

SECTION A: COMPULSORY

QUESTION 1

a) You are given raw data of test scores for GEP 224 as follows:

70, 64, 84, 74, 78, 50, 68, 68, 52, 64, 84, 66, 74, 50, 48, 56, 66, 56, 78, 74, 76, 52, 64, 38 and 40

Calculate:

i) The mean of the ungrouped data (3 marks)
ii) The variance using the two formulae (5 marks)

b) Group the data and:
i) Calculate the mean of the grouped data using two formulae (5 marks)
ii) Calculate the variance (3 marks)
iii) Calculate the standard deviation (3 marks)
iv) Comment on the mean of the grouped and ungrouped data (2 marks)

c) Design a questionnaire for collecting data given an assignment to examine the causes of the decline in maize production at Mahlalini in the Shiselweni district.
(19 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) Primary and secondary data (6 marks)
b) Parametric and non-parametric tests (6 marks)
c) Grouped and ungrouped data (6 marks)
d) Probability sampling and non-probability sampling (6 marks)
e) Ratio and interval data (6 marks)

(30 Marks)

QUESTION 3

a) Define the measures of skewness. (5 marks)
b) Calculate momental skewness and kurtosis of the following data: 6, 7, 5, 4, 8, 6, 9, 5, 8. and 7. (21 marks)
c) Explain the meaning of the skewness measures in (b) above. (4 marks)

(30 Marks)

QUESTION 4

Table 1 shows some hypothetical data on water capacity for two sites at Nhlangano Research Station. The Null hypothesis (H_0) states that there is no real difference in the water holding capacity between two sites. If there is any difference, then this might be due to the way the random samples of the soils have been taken. The Alternative (H_1) states that site A actually has higher water holding capacity than site B. The significance level has been set at 0.05.

a) Assuming the samples are from independent variables X (site A) and Y (site B). Apply a student's t-test for independent samples to determine whether you should reject H_0 in favour of H_1. (12 marks)

b) Assuming the sample values given in table 1, X for site A and Y for site B are paired, Apply the student's t-test for independent samples to determine whether you should reject or accept H_0 in favour of H_1. (10 marks)

c) Comment on the answers in (a) and (b) above. (4 marks)

d) Identify situations in which the student's t-test can be used. (4 marks)

(30 Marks)

QUESTION 5

A consultant has been hired to undertake a study at Emvembili a rural area in the Hhohho district. After a preliminary survey of the study area, he decided to employ the mail questionnaire in collecting data for the research.

a) Is this data collection method appropriate for the study? (2 marks)

b) Discuss the challenges the researcher might encounter when undertaking the study using the mail questionnaire. (28 marks)

(30 Marks)

Table 1 Water Holding Capacity at Malkerns Research Station

Samples from site A (variable X)	Samples from site B (variable Y)
82	91
80	72
99	62
20	85
25	71
54	86
50	58
46	29
70	45
58	101
102	88
44	61
76	83
55	74
60	80

Source: Hypothetical

t Table

cum. prob	$t_{.50}$	$t_{.75}$	$t_{.80}$	$t_{.85}$	$t_{.90}$	$t_{.95}$	$t_{.975}$	$t_{.99}$	$t_{.995}$	$t_{.999}$	$t_{.9995}$
one-tail	0.50	0.25	0.20	0.15	0.10	0.05	0.025	0.01	0.005	0.001	0.0005
two-tails	1.00	0.50	0.40	0.30	0.20	0.10	0.05	0.02	0.01	0.002	0.001
df											
1	0.000	1.000	1.376	1.963	3.078	6.314	12.71	31.82	63.66	318.31	636.62
2	0.000	0.816	1.061	1.386	1.886	2.920	4.303	6.965	9.925	22.327	31.599
3	0.000	0.765	0.978	1.250	1.638	2.353	3.182	4.541	5.841	10.215	12.924
4	0.000	0.741	0.941	1.190	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	0.000	0.727	0.920	1.156	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	0.000	0.718	0.906	1.134	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	0.000	0.711	0.896	1.119	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	0.000	0.706	0.889	1.108	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	0.000	0.703	0.883	1.100	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	0.000	0.700	0.879	1.093	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	0.000	0.697	0.876	1.088	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	0.000	0.695	0.873	1.083	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	0.000	0.694	0.870	1.079	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	0.000	0.692	0.868	1.076	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	0.000	0.691	0.866	1.074	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	0.000	0.690	0.865	1.071	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	0.000	0.689	0.863	1.069	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	0.000	0.688	0.862	1.067	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	0.000	0.688	0.861	1.066	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	0.000	0.687	0.860	1.064	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	0.000	0.686	0.859	1.063	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	0.000	0.686	0.858	1.061	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	0.000	0.685	0.858	1.060	1.319	1.714	2.069	2.500	2.807	3.485	3.768
24	0.000	0.685	0.857	1.059	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	0.000	0.684	0.856	1.058	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	0.000	0.684	0.856	1.058	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	0.000	0.684	0.855	1.057	1.314	1.703	2.052	2.473	2.771	3.421	3.690
28	0.000	0.683	0.855	1.056	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	0.000	0.683	0.854	1.055	1.311	1.699	2.045	2.462	2.756	3.396	3.659
30	0.000	0.683	0.854	1.055	1.310	1.697	2.042	2.457	2.750	3.385	3.646
40	0.000	0.681	0.851	1.050	1.303	1.684	2.021	2.423	2.704	3.307	3.551
60	0.000	0.679	0.848	1.045	1.296	1.671	2.000	2.390	2.660	3.232	3.460
80	0.000	0.678	0.846	1.043	1.292	1.664	1.990	2.374	2.639	3.195	3.416
100	0.000	0.677	0.845	1.042	1.290	1.660	1.984	2.364	2.626	3.174	3.390
1000	0.000	0.675	0.842	1.037	1.282	1.646	1.962	2.330	2.581	3.098	3.300
z	0.000	0.674	0.842	1.036	1.282	1.645	1.960	2.326	2.576	3.090	3.291
	0%	50%	60%	70%	80%	90%	95%	98%	99%	99.8%	99.9%
	Confidence Level										