GWANDA STATE UNIVERSITY

FACULTY OF NATURAL RESOURCES MANAGEMENT AND AGRICULTURE

DEPARTMENT OF HORTICULTURE AND CROP PRODUCTION

BACHELOR OF SCIENCE HONOURS DEGREE IN HORTICULTURE AND CROP PRODUCTION

NHC 1202 INTRODUCTION TO STATISTICS

SECOND SEMESTER EXAMINATION

JUNE 2024

NHC 1202 Introduction to statistics

Time Allowed: 3 hours

Total Marks: 100

Special Requirements: A scientific calculator

Examiner's Name: Dr. P. Zanamwe

INSTRUCTIONS

1. Answer **all** questions in Section A
2. Answer **TWO (2)** questions in Section B
3. Find Appendix 3 for *t*-table

MARK ALLOCATION

QUASTION	MARKS
SECTION A	60
SECTION B	40
TOTAL ATTAINABLE MARKS	100

SECTION A: ANSWER ALL QUESTIONS IN THIS SECTION

QUESTION ONE

Distinguish the following terms

i. Sample and population (4 Marks)
ii. Sampling and census (4 Marks)
iii. Parameters and statistics (4 Marks)
iv. Data and information (4 Marks)
v. Probability and non-probability sampling (4 Marks)

QUESTION TWO

The ages of 10 students studying introduction to statistics at Gwanda State University in 2023 are: 26, 28, 28, 16, 22, 35, 42, 19, 55 and 28.

a. Group the student ages into classes of 25 and below, 26 - 35, 36 - 45, above 45 and use the information to complete the table below. (16 Marks)

Age group	Frequency (Number of Students)	Proportions	Percentages	Angle
Below 25				
26 -35				
36 -45				
Above 45				

b. Use the information in the completed table to draw a bar graph (chart) of the student age groups.

QUESTION THREE

In a class of 30 students, marks obtained by students in mathematics out of 50 is tabulated below.

Marks Obtained	Number of student	Class Mark	$f_i x_i$
10-20	5	15	75
20-30	5	25	125
30-40	8	35	280
40-50	12	45	540
Total	$\Sigma f_i = 30$		$\sum f_i x_i = 1020$

Use the information in the table to calculate

i. Mean using the formula: $\bar{x} = \frac{\sum xf}{\sum f}$ (2 Marks)

ii. Mode using the formula: $\text{Mode} = \text{I} + [\frac{\text{f1}-\text{f0}}{(\text{f1}-\text{f0})+(\text{f1}-\text{f2})}]\ x\ c$ (4 Marks)

iii. Median using the formula:

$Median = l + \left(\frac{\frac{n}{2}-cf}{f}\right) x\ c$ (4 Marks)

iv. Third quartile range using the formula:

$Q3 = L + \frac{c}{f}\ (\frac{iN}{4} - cf)$ (4 Marks)

SECTION B: ANSWER TWO QUESTIONS IN SECTION B

QUESTION FOUR

Explain giving specific examples the following data scales

i. Nominal (5 Marks)

ii. Ordinary (5 Marks)

iii. Interval (5 Marks)

iv. Ratio (5 Marks)

QUESTION FIVE

a. Test at 5 % level of significance the null hypothesis H_0: μ = 100 where the alternative hypothesis is *Ha*: μ >100 for a sample size *n* = 24, ẋ =104.20 and *s*= 8.23. (10 Marks)

b. The yields obtained from a random sample of 6 plots sown with a new variety in the same region were 2.6, 2.1, 2.5, 2.4, 1.9, and 2.3 t/ha. Calculate 90% confidence intervals of the mean. (10 Marks)

QUESTION SIX

a. Discuss the following data collection methods

i. Observation (3 Marks)

ii. Interviews (9 Marks)

iii. Experimentation (3 Marks)

b. Distinguish giving examples primary from secondary data (5 Marks)

Appendix 3

Percentage Points of the *t*-distribution

	Percentage in top tail						
df	10	5	2.5	1	0.5	0.1	0.05
1	3.078	6.314	12.71	31.82	63.66	318.3	636.6
2	1.886	2.920	4.303	6.965	9.925	22.33	31.60
3	1.638	2.353	3.182	4.541	5.841	10.21	12.92
4	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	1.476	2.015	2.571	3.365	4.032	5.894	6.869
6	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	1.319	1.714	2.069	2.500	2.807	3.485	3.768
24	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	1.314	1.703	2.052	2.473	2.771	3.421	3.689
28	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	1.311	1.699	2.045	2.462	2.756	3.396	3.660
30	1.310	1.697	2.042	2.457	2.750	3.385	3.646
35	1.306	1.690	2.030	2.438	2.724	3.340	3.591
40	1.303	1.684	2.021	2.423	2.704	3.307	3.551
50	1.299	1.676	2.009	2.403	2.678	3.261	3.496
60	1.296	1.671	2.000	2.390	2.660	3.232	3.460
80	1.292	1.664	1.990	2.374	2.639	3.195	3.416
100	1.290	1.660	1.984	2.364	2.626	3.174	3.390
120	1.289	1.658	1.980	2.358	2.617	3.160	3.373
∞	1.282	1.645	1.960	2.326	2.576	3.090	3.291

Example: $t_{(9,2.5\%)} = 2.262$ means that the probability of a *t*-value greater than 2.262 is 2.5% for 9 df and the probability of a *t*-value outside the range -2.262 to $+2.262$ is 5% for 9 df.