

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

RESIT/SPECIAL

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE
(BOTANY)

BOTA 302: BIOSTATISTICS

STREAMS: B.Sc. (BOTA)

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 03/02/2021

11.30 A.M. – 1.30 P.M.

INSTRUCTIONS:

- Answer all the questions in section A and **TWO** questions in section B
- Use of calculators and statistical tables is allowed.
- Do not write anything on the question paper.

SECTION A (30 MARKS): ANSWER ALL QUESTIONS (COMPULSORY)

1. (a) Differentiate between cluster and stratified random sampling. (3 marks)
(b) List the characteristics of a good questionnaire. (2 marks)
2. Describe the stages in sampling process. (5 marks)
3. Explain the fundamental components that characterise every experimental design. (5 marks)
4. The population of the medicinal herbs is divided into five strata such that $N_1=650$, $N_2=480$, $N_3=360$, $N_4=1000$ and $N_5=1300$. Show how a sample size of $n=280$ should be allocated to the five strata if proportionate sampling was adopted. (5 marks)
5. A geneticist claims that it is faster to extract DNA using protocol 1 than protocol 2. To test the claim, eight technician of proven ability were assigned each to the two protocols and the time taken to extract the DNA was recorded as follows:

Technician	1	2	3	4	5	6	7	8
Protocol 1	26	38	40	22	32	38	36	46
Protocol 2	34	44	34	28	28	42	34	48

At a 5% level of significance, determine if the geneticist's claim is valid. (5 marks)

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6. It is expected that the distribution of certain disease in a given population is 3:1:1 for under 16, 16-25 and over 25 years. A random sample of 400 individuals was taken and 240 individuals were under 16, 60 were between 16-25 while the rest were over 25 years. Does the observed information agree with the expected ratios at 5% significance level? (5 marks)

SECTION B (40 MARKS): ANSWER ANY TWO QUESTIONS

7. Using the following data set, calculate the mean, mode, median, standard deviation coefficient of variation and Pearson measure of skewness of successive sale of a given firm (20 marks)

Number of sales	0-5	6-11	12-17	18-23	24-29	30-35
Number of salesmen	2	18	38	56	44	28

8. (a) The following data are measurements of the heparin cofactor II (HCII) to plasma protein ratios in a group of patients at baseline and five months after haemodialysis.

Patient	1	2	3	4	5	6	7	8
Before	2.11	1.85	1.82	1.75	1.54	1.52	1.49	1.44
After	2.15	2.11	1.93	1.83	1.9	1.56	1.44	1.43

Using an appropriate non-parametric procedure, at 5% significance level test determine if the two measurements are not significantly different. (8 marks)

- (b) Using the following data fit a regression model and obtain a correlation coefficient. (12 marks)

x	1	2	3	4	5	6	7
y	9	16	19	27	38	43	58

9. The amounts of oil extracted from a sunflower variety using four different extraction methods was obtained as follows:

Extraction method	Replicate 1	Replicate 2	Replicate 3
A	22	22	17
B	29	18	20
C	17	18	23
D	16	19	18

Perform analyse of variance and test if the four extraction methods are significantly different in their oil extraction potential at 5% significance level. (20 marks)