



## KENYATTA UNIVERSITY

### UNIVERSITY EXAMINATIONS 2011/2012

#### FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE AND BACHELOR OF EDUCATION (SCIENCE)

#### SZL 300: BIOSTATISTICS

**DATE:** Friday, 25<sup>th</sup> November, 2011

**TIME:** 8.00a.m. – 10.00a.m.

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#### INSTRUCTIONS

Answer **ALL** questions from **Section A** and any **ONE** question from **Section B** within a section all questions carry equal marks. Illustrate your answers with diagrams and give examples whenever appropriate.

#### SECTION A: [40 Marks]

Answer **ALL** questions in this section.

1. Give the term used to refer to
  - (a) Statistics that quantitatively describe the main features of a collection of data.
  - (b) Statistics that use the data to learn about the population.
  - (c) The statistics that try to locate the “centre” of a distribution of measurements.
  - (d) Statistics that try to determine how spread the measurements in a distribution area.
  - (e) Standard deviation of means.
  
2. A sample of 12 observations had a mean of 12.36 and a standard deviation of 3.23. Calculate the 95% and 99% confidence limits for the mean.

3. A researcher wanted to know if the following samples come from the same population and used the t-test to do so.

**Sample 1:** 12 13 12 13 17 21 16 11 24 12

**Sample 2:** 16 19 29 16 17 19 14 12 16 12

- (a) Give the appropriate formula for calculating the t-statistic.
- (b) Calculate the t-and make conclusion.
4. Answer true or false for the following statements:  
Correlation coefficient:
- (a) Measures only the linear relationship between variables high value of r does not necessarily give evidence of a linear relationship between the variables.
- (b) Does not provide evidence of cause-effect relationship between two variables.
- (c) Should not be used to judge the biological importance of the relationship between two variables.
- (d) Should be performed only when certain assumptions are satisfied.
5. In a community 10% of the population is colourblind. Out of 8 individuals, what is the probability that 5 will be colourblind?
6. Briefly explain the purpose of transforming data before performing ANOVA into:
- (a) Square root
- (b) Logarithm.
7. A study was conducted to find out whether a certain herbal solution is effective in curing wounds.

|           | <b>Herbal solution applied</b> | <b>Herbal solution not applied</b> |
|-----------|--------------------------------|------------------------------------|
| Cured     | 7                              | 13                                 |
| Not cured | 49                             | 58                                 |

Is there any association between the herbal solution and the curing of the wounds?

8. Using **three** specific examples, explain what is meant by categorical data.

### **SECTION B**

Answer **ONE** question in this section

9. The following data is for measurement of percentage water content and specific heat of twigs.

|                      |    |    |     |    |    |    |     |
|----------------------|----|----|-----|----|----|----|-----|
| <b>Water content</b> | 49 | 53 | 62  | 58 | 50 | 63 | 59  |
| <b>Specific heat</b> | 46 | 57 | 119 | 90 | 44 | 63 | 104 |

10. Six pupils were requested to rate three sites they had visited during education tours on a scale of 10. Rating 1 means excellent conditions and 10 the worst. Results are presented in the table below:

| <b>PUPIL</b> | <b>RATING OF THE SITES</b> |               |               |
|--------------|----------------------------|---------------|---------------|
|              | <b>SITE 1</b>              | <b>SITE 2</b> | <b>SITE 3</b> |
| 1            | 1                          | 2             | 5             |
| 2            | 2                          | 1             | 3             |
| 3            | 3                          | 4             | 5             |
| 4            | 2                          | 3             | 4             |
| 5            | 4                          | 3             | 6             |
| 6            | 2                          | 6             | 8             |

Use an appropriate nonparametric test to determine whether there is any difference in the rating of the three sites.

