THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

P.O. Box 62157
00200 Nairobi - KENYA
Telephone: 891601-6
Fax: 254-20-891084
E-mail:academics@cuea.edu

MAIN EXAMINATION

JANUARY – APRIL 2015 TRIMESTER

FACULTY OF SCIENCE

DEPARTMENT OF NATURAL SCIENCES (BIOLOGY)

REGULAR PROGRAMME

BIO 300: PRINCIPLES OF BIOSTATISTICS AND DATA ANALYSIS

Date: April 2015	**Duration: 2 Hours**
Instructions: Answer Question ONE and any other TWO Questions.	

Q1. a) Distinguish between the following biostatistics concepts.

i) Permutations and combinations.
ii) Correlation and regression
iii) Continuous and discontinuous variables
iv) Type I and Type II errors.
v) Descriptive and inferential statistics.

(5 marks)

b) Exactly 20% of chiloptellus larvae that a biology student studied were attacked by a larvae of cotesa species. Find the probability that if a sample of 10 Larvae of chiloptellus were studied 4 larvae would be found to have cotesia larvae.

(4 marks)

c) In an experiment 1400 individuals were found to have normally distributed blood glucose concentration with a mean of 65mg/100ml and a standard deviation of 25mgl/100ml.

i) What portion of the population has a blood glucose concentration greater than 85mg/100ml.

(2 marks)

ii) What proportion of the population has a blood glucose concentration less than 45mg/100ml.

(2 marks)

iii) What portion of the population has a blood glucose concentration of between 45mg/100ml and 85mg/100ml?

(2 marks)

iv) How many individuals have blood glucose concentration of more than 55 mg/100ml.

(2 marks)

d) An animal physiologist recorded the dissolving timer (in seconds) of a drug in gastric juice.
42.7, 43.4, 44.6, 45.1, 45.6, 45.9, 46.8, 47.6
Test the hypothesis that H_0 : $\mu \leq 45$ sec and H_A : μ >45 sec. at 0.05 level of significance.

(12 marks)

Q2. Two brands of water paints X and Y developed by natural science club at CUEA were applied on classroom walls to determine their average drying time (in seconds). The drying times were recorded as follows:

X	79.1	64.8	79.6	74.4	79.8	63.8
Y	89.3	73.6	68.0	82.5	81.6	87.0

Can the club members conclude paint X dries faster than paint Y? Use 0.05 level of significance.

(20 marks)

Q3. The following set of data represents the systolic blood pressure in mm of mercury from patients in mbagathi hospital.
121, 125, 128, 134, 136, 138, 139, 141, 144, 145, 149, 151

a) Calculate the mean, the variance, standard deviation and the standard error. Use working formula to calculate the variance.

(15 marks)

b) Attach a 95% confidence limit to the population mean of this population and set the confidence levels.

(5 marks)

Q4. a) Explain the meaning of one tailed and two tailed tests of significance.

(4 marks)

b) A study was conducted to investigate the effectiveness of motorcycle safety helmets in preventing head injury. A random sample of 793 individuals who were involved in motor cycle accidents during a specified one year period gave the results in the table.

	Wearing helmet	
Head injury	Yes	No
Yes	17	218
No	130	428

At $\alpha = 0.05$ test whether these is an association between the incidence of head injury and use of helmets among individuals involved in accidents.

(16 marks)

Q5. An ecologist wants to determine if the number of bacterial species is relate to location. Four beaches at the Kenyan Coast were randomly selected and the number of bacterial species over a 2 year period recorded as shown below.

Beach A	Beach B	Beach C	Beach D
14	17	19	23
16	16	20	12
17	18	22	21
13	15	21	10
22	16	18	9
9	12	19	15
10	14	15	16

What may the ecologist conclude at $\alpha = 0.01$?

END