



THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

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MAIN EXAMINATION

SEPTEMBER –DECEMBER 2021

FACULTY OF SCIENCE

DEPARTMENT OF BIOLOGY

REGULAR PROGRAMME

BIO 300: PRINCIPLES OF BIOSTATISTICS AND ANALYSIS

Date: DECEMBER 2021

Duration: 2 Hours

INSTRUCTIONS: Answer Question ONE and any TWO Questions

Q1.

- a) State FOUR assumptions of ANOVA **(2 Marks)**
- b) The data that categories patients as males or females are known as? **(2 Marks)**
- c) Suppose a random variable, x , arises from a binomial experiment. If $n = 23$, and $p = 0.22$, find the following probabilities (Use working Formula). **(4 Marks)**
- $P(x = 6)$
 - $P(x \leq 4)$
- d) Differentiate the following terms
- A population and a sample
 - Type one and Type two errors **(4 Marks)**
- e) State and define the measures of dispersion. **(5 marks)**
- f) Using the data below, calculate the measure of dispersion stated above.

66.1, 77.1, 74.6, 61.8, 71.5

(10 marks)

f) Calculate the value of RR if the risk of heart failure associated with an invention drug is 5% versus 9% with placebo? (3 Marks)

Q2. Consider the following data on the height of trees in a forest station.

X in cm: 10, 11, 15, 18, 20, 45, 73, 75, 86, 93, 112, 115

Calculate the following measures

- i. Mean
- ii. Median
- iii. Variance (use the working formula)
- iv. Standard deviation (use the working formula)
- v. Standard error of mean

(20 Marks)

Q3. The time x in years that a student spent in Catholic University of East Africa and the biology grades y for 5 students are listed in the table below. Calculate and interpret the relationship between x and y . (20 Marks)

X	5	3	4	10	15
y	25	20	21	35	38

Q4. a survey is conducted on germination rates for two species of been seeds. A random sample of eight been seeds of species J and species M is selected and the two are rated on a germination rate scale. The scores are as follows:

Species J	Species M
16	15
20	18
10	13
15	10
8	12
19	16
14	11
15	12

a. What would be the hypotheses for this scenario?

(2 Marks)

- b. Establish if there is a difference in mean growth rates of the two samples at an alpha level of 0.01 and make your conclusions. **(18 marks)**

Q5. When looking at a person's eye color, it turns out that 1% of people in the world has green eyes). Consider a group of 20 people.

- a.) State the random variable. **(1 Mark)**
- b.) Argue that this is a binomial experiment **(4 Marks)**
- c.) Find the probability that None have green eyes. **(3 Marks)**
- d.) Find the probability that Nine have green eyes. **(5 Marks)**
- e.) Find the probability that at least four have green eyes. **(5 Marks)**
- f.) In Brazil, four people out of twenty have green eyes. Is this unusual? What does that tell you? **(2 Marks)**

END

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