MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

P.O. Box 972-60200 – Meru-Kenya.
Tel: +254 (0)799529958, +254 (0)799529959, +254 (0)712524293
Website: www.must.ac.ke Email: info@must.ac.ke

University Examinations 2024/2025

FIRST YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF MASTERS IN PUBLIC HEALTH AND EPIDEMIOLOGY

MPH 5113/HPE 7113: MEDICAL BIOSTATISTICS/BIOSTATISTICS

DATE: JANUARY 2025 **TIME: 3 HOURS**

INSTRUCTIONS:
Answer Question one and any other three Questions

QUESTION ONE (30 MARKS)

Given that a binomial parameter has a probability of 0.8 (p) from a sample size (n) of 3, show by mean of binomial probability distribution that (6 Marks)

$\sum P(X=xi) = 1$ when; $p=0.8$; and $n=3$

Hint:

$${}_nC_x\, P^x\, Q^{n-x}$$

b) Define and describe Quantitative and Qualitative Random Variable. (6 Marks)

c) A simple random sample of 200 children of the same age is selected and weighed. The sample mean of their weights is 80 pounds and the sample standard deviation is s = 8 pounds. Give 90% and 95% confidence intervals for the mean weight of the children. (8 Marks)

d) i) Describe Type I and Type Il errors as used in Biostatistics. (5 Marks)

ii) Explain the similarities and differences between the p-value and confidence interval. (5 Marks)

QUESTION TWO (10 MARKS)

In a study conducted in Kenya, the heights in centimeters of 24 two — year old boys with homozygous sickle cell disease was found as follows;

84.4 89.9 81.9 87.0 78.5 84.1 86.3

80.6 80.0 81.3 86.8 83.4 89.8 80.6

85.0 82.5 80.7 84.3 85.0 85.5 81.9

Using the height and weight of United Kingdom (UK) as the reference or standard height for 2-year-old boys of 86.5cm, determine if the Kenyan 2year-old boys are statistically different from the UK standards. (Hint: Hypothesis Testing) (10 Marks)

QUESTION THREE (10MARKS)

The serum cholesterol level of 4,462 men was found to have a mean of 213, with a standard deviation of 42.

i. Calculate the standard error of the mean for the serum cholesterol level of men studied
ii. 95% confidence interval (Cl) for the serum cholesterol levels of the men in the study.

(10 Marks)

QUESTION FOUR (10 MARKS)

Discus the different types of Regression analyses and their application. (10 Marks)

QUESTION FIVE (10 MARKS)

State and Describe the appropriate test that can be used in each of the scenarios below. (10 Marks)

i. Comparing two independent populations, both normally distributed.
ii. Comparing two independent populations, one normally distributed and on is not normally distributed.
iii. Comparing three populations, all normally distributed.