"Investing in Africa's Future"

COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES

SHS 203: INTRODUCTION TO EPIDEMIOLOGY AND BIOSTATISTICS

END OF FIRST SEMESTER EXAMINATIONS

AUGUST/DECEMBER 2021

LECTURER: MR. E. CHIKAKA

DURATION: 5 HOURS

INSTRUCTIONS

ANSWER **ANY ONE** QUESTION

PLEASE STICK TO THE STANDARD HOUSE STYLE i.e.

- TIMES NEW ROMAN
- FONT SIZE 12
- DOUBLE SPACING
- APA REFERENCING
- SEND YOUR ANSWER AS A PDF DOCUMENT

THE MARK ALLOCATION FOR EACH QUESTION IS INDICATED AT THE END OF THE QUESTION

CREDIT WILL BE GIVEN FOR LOGICAL, SYSTEMATIC AND NEAT PRESENTATION

QUESTION 1

a. What do you understand by epidemiology and what are its function and uses in public health? [10]
b. Summarize the historical evolution of epidemiology [10]
c. List and explain the key features and uses of :
   i. Descriptive epidemiology [5]
   ii. Analytic epidemiology [5]
   iii. What do measures of central tendency and variation indicate? Describe the important measures of central tendency and another three measures of variation pointing out the situation when one measure is considered relatively appropriate in comparison to other measures. [10]
d. The following are the number of students absent from a college on 24 consecutive days: 29, 25, 31, 28, 30, 28, 33, 31, 35, 29, 31, 33, 35, 28, 36, 30, 33, 26, 30, 28, 32, 31, 38 and 27.
   i. Calculate range, IQR, mean, mode, median, variance, standard deviation and standard error of these data. [15]
   ii. Calculate the 95% confidence interval around the mean and interpret it [5]

e. Distinguish with examples the different types of scales of measurement and how each type is presented. [10]
f. Describe the processes, uses, and evaluation of public health surveillance. [10]
g. List and explain all the steps one needs to take in the investigation of a COVID-19 outbreak [10]

QUESTION 2

a. Define Epidemiology and state its FUNCTIONS in public health. [5]
b. Who do you consider as the main contributors to modern day epidemiology and why? [10]
c. Define and describe the three essential characteristics of disease that we look for in:
i. descriptive studies.
ii. analytic studies [10]
d. What are the measures of public health association and how are they measured? [10]
e. Discuss any three different study designs used in epidemiology [15]
f. List and explain all the data sources and data types as used in public health [10]
g. What do measures of central tendency and variation indicate? Describe any three important measures of central tendency and another three measures of variation pointing out the situation when one measure is considered relatively appropriate in comparison to other measures. Show how each measure is calculated. [20]
h. Distinguish with examples the different types of scales of measurement and how each type is presented. [10]
i. Define public health surveillance and list the essential activities and desirable characteristics of well-conducted surveillance activities [10]

QUESTION 3

a. Identify the core functions of an epidemiologist and biostatistician in public health [5]
b. Describe primary applications of epidemiology and biostatistics in public health practice [5]
c. What are the guidelines for judging whether an association between exposure and outcome is causal? Give an example of each. [10]
d. Distinguish with examples the different types of scales of measurement and how each type is presented. [10]
e. Are the following nominal, ordinal, interval or ratio data? Explain your answers.
(i) Temperatures measured on the Kelvin scale.
(ii) Police ranks.
(iii) National Social Security numbers.
(iv) Number of passengers on buses from Harare to Mutare.
(v) Code numbers given to the religion of persons attempting suicide. [10]

f. A sample of 10 individuals is selected for participation in a study of cardiovascular risk factors. The following data represent the ages of the enrolled individuals measured in yeas (continuous variable). The data are as follows:

85 83 82 79 77 76 73 63 68 75

(i) Find the sample mean, standard deviation and standard error of the mean. Interpret the standard deviation of the mean [8]
(ii) Explain when you would use the median instead of the mean as a measure of central tendency? [2]

h. Explain validity and reliability of analytic tests (screening and analytic tests) and how one can check for them. [10]
i. A mammogram detects 300 positives for breast cancer, of which 170 are incorrect, and 700 negatives, of which 80 are incorrect.
j. Construct a 2 x 2 table to measure the diagnostic performance of a mammogram for breast cancer [4]

TEST	CANCER	NO CANCER	TOTAL
+			
-			
TOTAL			

ii. What is the sensitivity, specificity of the mammogram [4]
iii. What is the false positive and false negative rate? [4]
iv. What is the positive and negative predictive value? [4]
v. What is the accuracy of the mammogram? [4]

j. What do you understand by disease transmission? Explain with an example the epidemiologic triad, the mode of transmission, chain of infection and how one can stop the transmission. [20]