



**MASINDE MULIRO UNIVERSITY OF  
SCIENCE AND TECHNOLOGY  
(MMUST)**

**MAIN CAMPUS  
SCHOOL OF NURSING MIDWIFERY AND PARAMEDICAL SCIENCES**

**UNIVERSITY EXAMINATIONS  
2022/2023 ACADEMIC YEAR**

**FOR THE DEGREE OF BACHELOR OF SCIENCE IN GLOBAL  
HEALTH AND TRAVEL MEDICINE**

**COURSE CODE: NCG 126  
COURSE TITLE: INTRODUCTION TO EPIDEMIOLOGY**

**DATE: 13<sup>TH</sup> APRIL 2023**

**TIME: 8 AM – 11 AM**

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**INSTRUCTIONS TO CANDIDATES**

All questions in the three sections (A, B and C) are compulsory.

**DURATION: 3 Hours**

Answer all questions on the booklet provided.

MMUST observes ZERO tolerance to examination cheating.

## SECTION A - MULTIPLE CHOICE QUESTIONS AND TRUE/FALSE QUESTIONS

(20 Marks)

### MULTIPLE CHOICE QUESTIONS ON QUESTIONS 1-15

(15 Marks)

*Instructions: Choose the most appropriate answer*

1. When designing a study to determine whether there is a direct association between a particular exposure and an outcome, one should anticipate that potential alternative explanation(s) may exist. Which of the following is a way to deal with confounding?
  - A. Post-hoc blocking
  - B. Randomization
  - C. Screening
  - D. Validation
2. Which of the following is the measure of frequency over time:
  - A. Proportion
  - B. Rate
  - C. Incidence
  - D. Ratio
3. The mode is the value that:
  - A. Is midway between the lowest and highest value.
  - B. Occurs most often.
  - C. Has half the observations below it and half above it
  - D. Is statistically closest to all the values in the distribution.
4. The geometric mean is the value that:
  - A. Is midway between the lowest and highest value on a log scale.
  - B. Occurs most often on a log scale.
  - C. Has half the observations below it and half above it on a log scale
  - D. Is statistically closest to all the values in the distribution on a log scale.
5. The mode of transport of an infectious agent through the environment to a susceptible host is called a:
  - A. Carrier
  - B. Reservoir
  - C. Vector
  - D. Vehicle.
6. What is herd immunity?
  - A. The number of disease-fighting white blood cells in a person

- B. The protection the whole population has against a disease because a threshold number of individuals are immune to the disease.
  - C. Immunity in a herd of cows
  - D. The number of people that opt out of getting vaccinations.
7. A laboratory test has been developed to assess the risk of prostate cancer among men. Studies with human subjects involving repeated measures indicate that the test yields the same results for every individual again and again, However, other studies indicate that there is a very low correlation between this new test for prostate cancer and already-existing tests with proven track records. The areas of relative strength and relative weakness of this new test respectively are:
- A. Sensitivity and Specificity
  - B. Specificity and sensitivity
  - C. Reliability and validity
  - D. Validity and reliability
8. Which level of prevention is aimed at reducing the risk factors of a disease
- A. Primary prevention
  - B. Secondary prevention
  - C. Tertiary prevention
  - D. All the above
9. The probability that a test correctly classifies positive individuals who have a preclinical disease is referred to as:
- A. Sensitivity of a test
  - B. Specificity of a diagnostic test
  - C. Positive Predictive Value of a diagnostic test
  - D. Negative Predictive Value of a diagnostic test
10. All the following are true of odds ratio **EXCEPT**:
- A. It is an estimate of relative risk.
  - B. It is the only measure of risk that can be obtained directly form a case-control study.
  - C. It tends to be biased towards 1 (neither risk or protection) at high rates of disease
  - D. It is the ratio of incidence in exposed divided by incidence in nonexposed.
11. There was a rapid increase in the spread of “Super Gonorrhoea” in December in Nairobi region. Health care facilities were advised to screen all patients seeking health care in the region of the disease. Which type of screening was applied.
- A. Mass screening
  - B. Opportunistic screening
  - C. Multipurpose screening
  - D. Multiphasic screening

12. The number of women in Kenya who died of cervical cancer in the year 2004 divide by the number of women who died of cancer in Kenya in 2004
- A. Ratio
  - B. Proportion
  - C. Incidence proportion
  - D. Mortality rate
13. The number of women in Kenya who died from Cervical cancer in 2004 divided by the number of women in Kenya who died from breast cancer in 2004.
- A. Ratio
  - B. Proportion
  - C. Incidence proportion
  - D. Mortality rate
14. The number of women in Kenya who died from lung cancer in 2004 divided by the estimated number of women living in Kenya on July 1, 2004
- A. Ratio
  - B. Proportion
  - C. Incidence proportion
  - D. Mortality rate

**INDICATE WHETHER THE STATEMENT IS TRUE OR FALSE FOR QUESTIONS 15 - 20 (½ MARK EACH)**

- 15.
- a. Incidence is a measure of risk.
  - b. Prevalence is generally preferred for chronic diseases without clear date of onset.
- 16.
- a. Incidence is used in calculation of risk ratio.
  - b. Incidence is affected by duration of illness.
- 17.
- a. All proportions are ratios, but not all ratios are proportions.
  - b. A proportion is dependent upon time.
- 18.
- a. The positive predictive value of a screening test depends on the prevalence of the disease in the community.

- b. In many countries, healthcare providers are required to 'notify' cases of cancer to the local or national cancer registry. This is an example of active surveillance.

19.

- a. Epidemiology is the basic science of Public Health.
- b. Epidemiologic methodology can be used to determine whether syndromes are related to each other or represent distinct conditions.

20.

- a. The first step of the scientific method is hypothesis development and prediction.
- b. Vital statistics are figures pertaining to risk and development of disease and illness.

## **SECTION B: SHORT ANSWER QUESTIONS**

**(40 Marks)**

*Instructions: Answer all Questions*

1. Distinguish between the following terms in Epidemiology:
  - a. Validity and Reliability of a diagnostic tool (2 Marks)
  - b. Epidemic, Endemic and Pandemic of a disease (3 Marks)
2. Explain the key terms in the definition of Epidemiology (10 Marks)
3. With the help of a diagram, explain the Epidemiological model of disease transmission (6 Marks)
4. Outline any **FOUR** measures of mortality (4 Marks)
5. A study was made of a clinician's ability to diagnose streptococcal throat infections in 149 patients coming to the emergency department in a certain hospital. The doctor's clinical impressions were compared to results of throat cultures or group A streptococcus. 37 patients had positive throat cultures and 27 of these were diagnosed by doctor as

having strep throat. 112 patients had negative cultures, and the doctors diagnosed 35 of these as having strep throat. Answer the following questions:

- a. Draw a 2 by 2 table and fill in the above findings (3 Marks)
- b. Calculate the Sensitivity of the doctor's clinical judgement (4 Marks)
- c. Calculate the Specificity of the doctor's clinical judgment (4 Marks)
- d. Calculate the Positive Predictive Value of the clinical judgement (2 Marks)
- e. Calculate the Negative Predictive Value of the clinical judgement (2 Marks)

**SECTION C: LONG ANSWER QUESTIONS**

**(40 Marks)**

*Instructions: Answer all questions*

1. Describe the various Epidemiological study designs that can be used when conducting an epidemiological study (20 Marks)
2. Surveillance has detected a rising case of vomiting, diarrhoea and abdominal pain that has been experienced by people living in Koromatangi- Kakamega region. This condition has overwhelmed the resources available in the region. You have been deployed there to investigate this disease outbreak. Describe the steps you will use in investigating this disease outbreak (20 Marks)