



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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UNIVERSITY EXAMINATIONS 2024/2025

SECOND YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR  
OF SCIENCE IN NURSING

**NND 3216 – EPIDEMIOLOGY AND DEMOGRAPHY**

**DATE: JANUARY 2025**

**TIME: 2 HOURS**

**INSTRUCTIONS:** *All questions are compulsory*

Ensure that all your answers are properly numbered

Part 1 Multiple Choice Questions (MCQs): Write the correct answer on the space provided in the answer booklet. Each MCQ is one mark.

Part 11: Short Answer Questions-Answer questions following each other on the answer booklet

Part 111: Long Answer Questions-Answer

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**SECTION A: SHORT ANSWER QUESTIONS (20 MARKS)**

1. Which of the following is not a reason why we study epidemiology?
  - a. To determine the magnitude of disease in a population
  - b. To know where the disease originated from
  - c. To understand the progression of a disease
  - d. None of the above
2. Epidemiology gives ideas on what kind of changes that have occurred in a community over a period of time;
  - a. True
  - b. False
3. Endemic means that a disease



- a. Is prevalent among animals
  - b. Occurs clearly in excess of normal expectancy
  - c. Is habitually present in human populations
  - d. Affects a large number of countries simultaneously
4. Which of the following is an advantage of active surveillance?
- a. Is relatively inexpensive to employ
  - b. More accurate due to reduced reporting burden for health care providers
  - c. Requires less project staff
  - d. Relies on different disease definitions account for all cases
5. In clinical trials, random assignment is one of the preferred ways of conducting these studies, what is the main reason for this choice?
- a. Reduce selection bias in the allocation of treatment
  - b. Ensure that the study groups have comparable baseline characteristics
  - c. Facilitate double blinding (masking)
  - d. Facilitate the measurement of variables
6. The purpose of a double blind or double masked study is to:
- a. Reduce the effects of sampling variation
  - b. Avoid observer bias and sampling variation
  - c. Avoid observer and subject bias
  - d. Avoid subject bias and sampling variation
7. Which of the following is not an advantage of a prospective cohort study?
- a. It usually costs less than case-control study
  - b. Precise measurement of exposure is possible
  - c. Incidence rates can be calculated
  - d. Recall bias is minimized compared with a case-control study
8. Retrospective cohort studies are characterized by all of the following except:
- a. The study groups are exposed and non-exposed
  - b. Incidence rates may be compared
  - c. The required sample size is smaller than that needed for a prospective cohort study
  - d. The required sample size is similar to that needed for prospective cohort study

9. A case-control study is characterized by all of the following except:
- It is relatively inexpensive compared with other epidemiologic study designs
  - Patients with the disease (cases) are compared with persons without the disease (controls)
  - Incidence rates may be computed directly
  - Definition of cases may be difficult
10. In a case-control study, which of the following is true?
- The proportion of cases with the exposure is compared with the proportion of controls with the exposure
  - The investigator may choose to have multiple comparison groups
  - Recall bias is a potential problem
  - All of the above
11. At an initial examination in county X, migraine headache was found in 5 of 1,000 men aged 30-35 years and in 10 of 1,000 women aged 30 to 35 years. The inference that women have a two times greater risk of developing migraine headache than do men in this age group is:
- Correct
  - Incorrect, because of failure to recognize the effect of age in two groups
  - Incorrect, because no data for a comparison or control group are given
  - Incorrect, because of failure to distinguish between incidence and prevalence
12. On Day 1 of a technology conference in Naivasha, 15 presenters who were setting up for their sessions in Breakaway room X became ill with flu-like symptoms. During the course of the conference, 20 participants who attended sessions in Breakaway room X also became ill with the same symptoms. To begin calculating the rate of this outbreak, investigators should first determine.
- The size of the conference population.
  - The number of cases of illness.
  - The number of days the conference was held.
  - The location of the conference.
13. In March 2024, an outbreak of measles occurred among employees at Factory J in Mombasa.



This group of cases in this specific time and place can be described as a

- 
- a. Distribution
  - b. Cluster
  - c. Determinant
  - d. Population
14. Epidemiologists use a model for studying infectious disease and its spread that involves the microbe that causes the disease, the organism that harbors the disease, and the external factors that cause or allow disease transmission. This is also known as
- a. Host, vector, and transmission.
  - b. Transmission, host, and environment.
  - c. Host, agent, and environment.
  - d. Organism, transmission, and environment.
15. Which of the following are examples of a health-related source of data collection?
- a. Intoxicated driver arrests.
  - b. Electronic health records.
  - c. Measurement of toxins in a river.
  - d. Medical board action against a physician.
16. A hospital in Kwale reported an outbreak of fever of unknown origin, KEMRI then launched an investigation. However, no effective communication existed between scientists in the field interviewing patients and those in the laboratory who were testing specimens. As a first step in stopping this outbreak, what should the team have done to identify persons who were part of the outbreak?
- a. Verify a diagnosis.
  - b. Establish a case definition to identify cases.
  - c. Communicate findings to the public.
  - d. Implement prevention measures.
17. In speculating that the cooling system might be the source of the outbreak, what step was the epidemiologist implementing?
- a. Developing a hypothesis.
  - b. Refining a hypothesis.
  - c. Evaluating a hypothesis.



- d. Verifying a diagnosis.
18. In January 2024, the Legionella bacterium was finally identified and isolated and was found to be breeding in the cooling tower of the hotel's air-conditioning system; the bacteria then spread through the building whenever the system was engaged. What should the investigation team do regarding their original hypothesis?
- Evaluate it.
  - Refine it.
  - Confirm it.
  - Both A and B.
19. The finding from this outbreak investigation lead to development of new regulations worldwide for climate control systems. What step does this illustrate?
- Communicate the findings.
  - Implement control and prevention measures.
  - Perform descriptive epidemiology.
  - Refine the hypothesis.
20. The following methods are used in epidemiology, which one is not?
- Public health surveillance and Disease investigation
  - Publication in scientific journals
  - Analytic studies
  - Program evaluation

**SECTION B: SHORT ANSWER QUESTIONS: (30 MARKS)**

- Using appropriate examples, show how primary, secondary and tertiary prevention is applied in epidemiology (5 marks)
- Prevention of disease can be done at population level or based on identified high risk group, briefly explain how this can be achieved in the two groups (5 marks)
- What does the term "causal relationship" refer to in epidemiology? (4 marks)
- The following individuals used what they observed to prevent/reduce morbidity and high mortalities, briefly describe what they observed and what they did to achieve great changes in the specific diseases of interest they worked on: (6 marks)
  - Edward Jenner
  - John Snow
  - Philip Semmelweis

5. Using the epidemic triad, explain how you can apply it to bring an epidemic under control. (4 marks)
6. Differentiate between (6 marks)
  - a. Prevalence and incidence
  - b. Epidemic and endemic
  - c. Hyper-endemic and holo-endemic

### **SECTION C: LONG ANSWER QUESTION (20 MARKS)**

1. On 27<sup>th</sup> October the sub-county disease surveillance coordinator reported to the County Health Management Team (CHMT) that 29 people in Kamachege village in Nkubu, had presented to the Sub-County Hospital with diarrhea, nausea, vomiting and dehydration. Unfortunately, 7 (two adults and 5 children) had succumbed just a few hours after they were admitted in hospital. The 29 are currently receiving treatment in the hospital. It is also said that there could be some community infections and probably some community deaths. Please explain how you would conduct the investigation and your possible findings. Clearly show what your role will be as a nurse in this investigation.

