



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

**UNIVERSITY EXAMINATIONS  
2013/2014 ACADEMIC YEAR**

**SECOND YEAR TRIMESTER III EXAMINATIONS**

**FOR THE DEGREE  
OF  
BACHELOR OF SCIENCE IN HEALTH PROFESSIONS  
(MEDICAL) EDUCATION**

**COURSE CODE: HPE 219**

**COURSE TITLE: MEDICAL EPIDEMIOLOGY**

**DATE: Wednesday 13<sup>th</sup> August, 2014      TIME: 2.00p.m. – 5.00p.m.**

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**INSTRUCTIONS:**

1. Write your University registration number on every sheet of paper used
2. Answer ALL questions in all the three sections
3. Section A comprises of Multiple Choice Questions
4. Section B comprises of 7 short Answer Questions
5. Section C comprises of 4 Essay Questions

**TIME: 3 Hours**

This Paper Consists of 5 Printed Pages. Please Turn Over ►

**SECTION A (20 Marks)**

1. In the definition of epidemiology, the terms “distribution” and “determinants” taken together refer to:
  - a. Frequency, pattern, and causes of health events
  - b. Dissemination of information to those who need to know
  - c. Knowledge, attitudes, and practices related to health
  - d. Public health services and resources
2. **Descriptive epidemiology** includes all EXCEPT:
  - a. What
  - b. Who
  - c. When
  - d. Where
  - e. Why
3. The time course of a disease outbreak is usually displayed as a/an:
  - a. Secular trend
  - b. Seasonal trend
  - c. Epidemic curve
  - d. Endemic curve
4. When analyzing data by age the categories should be:
  - a. The same for all diseases
  - b. <1 year, 1 to 4 years, 5 to 9 years, 10 to 14 years, 15 to 19 years, and 20 years for communicable diseases, but not necessarily for chronic diseases
  - c. Appropriate for each condition and narrow enough to detect any age-related patterns present in the data
  - d. 5-year age groups for all diseases unless the data suggest the need for narrower categories to find a pattern or aberrancy
5. Because socioeconomic status is difficult to quantify, we commonly use all of the following substitute measures EXCEPT:
  - a. Educational achievement
  - b. Family income
  - c. Occupation
  - d. Social standing
6. The Cancer and Steroid Hormone (CASH) study, in which women with breast cancer and a comparable group of women without breast cancer were asked about their prior use of oral contraceptives (“the Pill”), is an example of which type of study? (Circle ALL that apply.)
  - a. Experimental
  - b. Observational
  - c. Cohort
  - d. Case-control
  - e. Clinical trial
7. The primary difference between an experimental and observational study is:
  - a. The investigator is “blinded” (prevented from knowing the subjects’ true exposure status until the end of the study) in an experimental study but not in an observational study
  - b. The investigator controls the subject’s exposure in an experimental study but not in an observational study
  - c. The investigator controls the subject’s outcome in an experimental study but not in an observational study
  - d. Experimental studies are conducted with animals; observational studies are conducted with humans
8. The functions of public health surveillance include which of the following? (Circle ALL that apply.)
  - a. Collection of health data

- b. Analysis of health data
  - c. Interpretation of health data
  - d. Dissemination of health data
  - e. Disease control actions developed from the collection, analysis, and interpretation of data
9. An epidemic curve which follows the classic log-normal pattern of sharp rise and more gradual decline is most consistent with which manner of spread?
- a. Continuous source
  - b. Intermittent source
  - c. Point source
  - d. Propagated
  - e. Mixed
10. Of the variables listed below, which would you use a nominal scale for?
- a. Antibody titers against influenza A/H1N1
  - b. Sex
  - c. Height in centimeters
  - d. Parity
  - e. "Were you hospitalized in the week?"
11. Frequency distributions are appropriate for:
- a. Nominal scale variables only
  - b. Ordinal scale variables only
  - c. Both nominal scale and ordinal scale variables
  - d. Neither nominal scale nor ordinal scale variables

12. Fraction for question 11:

#women in the Kenya who died from cancer in 2012

# women in the Kenya who died from heart disease in 2012

The fraction shown above is a: (Circle ALL that apply.)

- a. Ratio
- b. Proportion
- c. Attack rate
- d. Mortality rate

Questions 13-15 describe the case-report pattern of disease X for three communities. The communities have the same size population. Identify which term A-D below best describes the occurrence of disease X.

- A. Endemic
- B. Epidemic
- C. Hyperendemic
- D. Pandemic

13. \_\_\_ Community A: usually 10 cases/week; last week, 28 cases
14. \_\_\_ Community B: 50-70 cases/week; last week, 55 cases
15. \_\_\_ Community C: usually 25 cases/week; last week, 28 cases
16. Both incidence and prevalence can be represented by the formula  $(x/y) \times 10^n$  for a specified time period. The primary difference between incidence and prevalence is in:
- a.  $x$
  - b.  $y$
  - c.  $10^n$
  - d. The time period of reference
17. A recent train derailment exposed residents of a community to a chemical hazard. Many residents became ill; some died. To calculate the **probability** or **risk** of illness, which denominator would you use?
- a. The size of the population at risk at the beginning of the period
  - b. The size of the population at risk at the midpoint of the period
  - c. The size of the population at risk at the end of the period

- d. The average size of the population at risk during the period
18. Numerator = number of children with Down syndrome who were younger than 12 years of age in Nairobi on July 1, 2011. Denominator = total number of children who were younger than 12 years of age in Nairobi on July 1, 2011. A measure using the numerator and denominator described above is an example of a/an:
- Incidence rate
  - Attack rate
  - Person-time rate
  - Point prevalence
  - Period prevalence

### Section B (40 Marks)

19. In the early 1980's, epidemiologists recognized that AIDS occurred most frequently in men who had sex with men and in intravenous drug users. Describe how this information might be used for each of the following:
- Population or community health assessment
  - Individual decisions
  - Search for causes
- (6 Marks)
20. Classify each of the following studies as experimental, observational/cohort, observational/case control, or not an epidemiologic study.
- \_\_\_\_\_ Vietnam Experience Study: Subjects were several thousand soldiers stationed in Vietnam from 1969-1971 and several thousand soldiers stationed in Europe from 1969-1971. In the mid-1980's, investigators determined and compared the death rate and prevalence of illness in both groups.
  - \_\_\_\_\_ Subjects were 59 patients with end-stage cancer. All were given a new treatment. The monthly survival was charted over 2 years.
  - \_\_\_\_\_ Subjects were persons with laboratory-confirmed trichinosis, and one healthy friend of each. All subjects were asked about their consumption of pork and other meat products.
  - \_\_\_\_\_ Subjects were children enrolled in a health maintenance organization. At 18 months, each child was randomly given one of two types of vaccine against *Haemophilus influenzae*. Parents were asked to record any side effects on a card, and mail it back after 2 weeks.
- (8 Marks)
21. Use the Agent-Host-Environment model to describe the role of the human immunodeficiency virus (HIV) in AIDS.
- Agent:
  - Host:
  - Environment
- (6 Marks)
22. Some of the risk factors for heart disease are smoking, hypertension, obesity, diabetes, high cholesterol, inactivity, stress, and type A personality. Are these risk factors necessary causes, sufficient causes, or component causes?
- (6 Marks)
23. For each of the following outbreak settings, choose the most likely epidemic pattern.
- | <b>Pattern</b> | <b>Outbreak Setting</b>   |
|----------------|---|
| a. _____       | Outbreak of salmonellosis traced to turkey cooked and held at an improper temperature and served at a pot-luck supper.                                    |
| b. _____       | Outbreak of influenza among nursing home residents, new cases occurring over a 3-week period (Hint: incubation period for influenza is less than 5 days.) |
| c. _____       | Episodic cases of Legionnaires' disease in hospitalized patients traced to showers and the hospital's water supply.                                       |
- (6 Marks)

24. Discuss four components of a case definition (4 Marks)
25. Listed below are data on parity collected from 19 women who participated in a study on reproductive health. Organize these data into a frequency distribution.  
0, 2, 0, 0, 1, 3, 1, 4, 1, 8, 2, 2, 0, 1, 3, 5, 1, 7, 2 (4 Marks)

**Section C (20 Marks)**

26. In 1990, 41,595 new cases of AIDS were reported in Kenya. The 1990 midyear population was estimated to be 28,710,000. Calculate the 1990 AIDS incidence rate. (5 Marks)
27. In a particular community, 115 persons in a population of 4,399 became ill with a disease of unknown etiology. The 115 cases occurred in 77 households. The total number of persons living in these 77 households was 424.
- Calculate the overall attack rate in the community.
  - Calculate the secondary attack rate in the affected households, assuming that only one case per household was a primary (community-acquired) case.
  - Is the disease distributed evenly throughout the population? (15 Marks)
28. In the early 1980's, epidemiologists recognized that AIDS occurred most frequently in men who had sex with men and in intravenous drug users. (10 Marks)
- Describe how this information might be used for each of the following:
- Population or community health assessment
  - Individual decisions
  - Search for causes

