

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

**(MAIN CAMPUS)**

**UNIVERSITY EXAMINATIONS  
2018/2019 ACADEMIC YEAR**

**FOURTH YEAR SECOND SEMESTER  
MAIN EXAMINATIONS**

**FOR THE BACHELOR OF SCIENCE  
IN  
MEDICAL LABORATORY SCIENCES AND MEDICAL  
BIOTECHNOLOGY  
(DIRECT ENTRY AND UPGRADING)**

**COURSE CODE: BML 424**

**COURSE TITLE: COMMUNITY HEALTH AND EPIDEMIOLOGY**

**DATE: 23<sup>RD</sup> MAY 2019**

**TIME: 8.00 -10.00 AM**

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**INSTRUCTIONS:**

**ANSWER ALL QUESTIONS IN SECTION A AND B, ONLY TWO IN SECTION  
C**

TIME: 2 Hours

MMUST observes ZERO tolerance to examination  
cheating

This Paper Consists of 7 Printed Pages. Please Turn Over

**SECTION A (20MKS): ANSWER ALL QUESTIONS: CHOOSE THE MOST APPROPRIATE ANSWER**

1. Epidemiologists define disease occurrence in terms of:
  - a. Agent
  - b. Host
  - c. Environment
  - d. All of the above
  
2. Which of the following factors play a key role in likelihood of infectious disease acquisition?
  - a. Genetic profile
  - b. Human behavior
  - c. Environmental conditions
  - d. All of the above
  
3. Virulence is the:
  - a. Ability to cause clinical disease
  - b. Ability to cause severe disease
  - c. The ability to evoke an immune response
  - d. All of the above
  - e. a. and b. above
  
4. The basic code of ethical research (respect for persons, beneficence, and justice) was first established by the:
  - a. Nuremberg Code
  - b. Declaration of Helsinki
  - c. CIOMS
  - d. Belmont Report
  
5. The most important element of ethical research on human subjects is:
  - a. Beneficence
  - b. Justice
  - c. A methodologically sound study design
  - d. Informed consent
  
6. Choose the most appropriate explanation on “Prevalence rate”:
  - a. the number of patients who have the disease at a particular time, divided by the population at risk of having the disease at that time.
  - b. the number of new cases of a diseased in a population over a period of time.
  - c. not useful for developing HIV/AIDS control programme.
  - d. useful for developing Avian flu control programme.

7. Which type of the study design below indicated.
- An investigator takes a sample of healthy individuals, record their ongoing solar exposure, and relate that to the subsequent occurrence of skin cancer in the same group.
- Case-control study
  - Ecological study
  - Cohort study
  - Cross-sectional study
8. Which of the following is an advantage of a case-control study?
- There is little or no bias in assessment of exposure.
  - Multiple disease outcomes following a selected exposure can be readily studied.
  - Dependence on recall by subjects in the study minimized.
  - It may be used to study etiology of a rare disease
9. Surveillance data must be:
- Rapidly collected
  - Use simple case definitions
  - Provide very precise estimates
  - a. and b. above
10. Most surveillance systems use which of the following study designs?
- Cohort
  - Serial cross-sectional
  - Mortality
  - Syndromic
11. Which of the following best describes the retrospective design where subjects are sampled by disease status and is often used when the investigator is interested in rare diseases.
- intervention trial
  - case control study
  - retrospective cohort
  - ecologic study
12. A study in which children are randomly assigned to receive either a newly formulated vaccine or the currently available vaccine, and are followed to monitor for side effects and effectiveness of each vaccine, is an example of which type of study?
- Experimental Clinical trial

- B. Observational
  - C. Cohort
  - D. Case-control
13. A study was conducted to investigate the effect of HIV infection on mortality among people in Kenya with TB. Individuals with TB were recruited from hospitals and their HIV status determined. They were then followed-up over ten years to compare mortality rates in the HIV positive group and HIV negative group.
- a. Case-control study
  - b. Cohort study
  - c. Randomized controlled trial
  - d. Ecological study
14. The most important goal of a behavioral intervention is:
- a. Change in behavior
  - b. Comprehensive coverage
  - c. Effective use of behavioral theory
  - d. Sustained behavior change
15. The strength of an association is one of the criteria for evaluating the cause and effect relationship between an exposure and outcome. Which of the following is a measure of the strength of association? (Choose one best answer).
- a. Incidence rate among the exposed
  - b. cumulative incidence among the exposed
  - c. the ratio of odds of exposure among cases to the odds of exposure among the non cases
  - d. odds of disease among exposed relative to the prevalence of exposure in the source population
16. The highest risk of transmission from mother to infant occurs:
- a. In-utero
  - b. During the birth
  - c. Through breast feeding
  - d. The risk is equal during all stages of pregnancy and delivery
17. The three guiding principles of ethical research involving humans are:
- a. Empathy, caution and truthfulness
  - b. Respect for persons, beneficence and justice
  - c. Respect for human dignity, compensation and integrity
  - d. Beneficence, legal recourse and reimbursement
18. Comparing numbers and rates of illness in a community, rates are preferred for: (Choose one best answer)

- a. Conducting surveillance for communicable diseases
  - b. Deciding how many doses of immune globulin are needed
  - c. Estimating subgroups at highest risk
  - d. Telling physicians which strain of influenza is most prevalent
19. John Snow's investigation of cholera is considered a model for epidemiologic field investigations because it included a:
- a. Biologically plausible hypothesis
  - b. Comparison of a health outcome among exposed and unexposed groups
  - c. Multivariate statistical model
  - d. Spot map
20. Comparing numbers and rates of illness in a community, rates are preferred for:  
(Choose one best answer)
- a. Conducting surveillance for communicable diseases
  - b. Deciding how many doses of immune globulin are n
  - c. Estimating subgroups at highest risk
  - d. Telling physicians which strain of influenza is most prevalent
- 1.

**SECTION B: SHORT ANSWER QUESTIONS (40 Marks)**

**Instructions**

- The section has a total of NINE (9) short answer questions (SAQs), carrying a maximum of forty (40) marks total.
- Answer all the questions
- Write your answers on the provided university examination booklet

21. Define the following terms as used in epidemiology ( 4mks)

- i. Prevalence
- ii. Distribution
- iii. Frequency
- iv. Herd immunity

22. Highlight five core functions of epidemiology 5mks

23. Giving examples, classify disease transmission in epidemiology 5mks

24. For each of the following, identify the appropriate letter from the time line in Figure 1.1 representing the natural history of disease. (4mks)

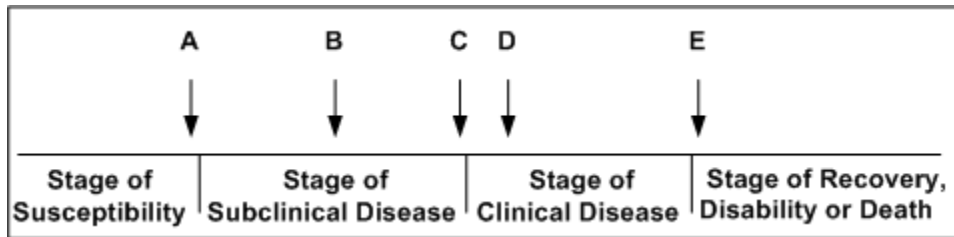
i\_\_\_\_ Incubation period

ii\_\_\_\_ Pathological changes

iii\_\_\_ Exposure

Iv\_\_\_ Usual time of diagnosis

Figure 1.1 Natural History of Disease Timeline



25. Using Malaria as an example, describe chain of infection 5mks

26. Highlight four sources of bias in cohort studies 4mks

27. Differentiate between parametric and non parametric test 4mks

28. Differentiate between observational and experimental epidemiologic studies 5mks

29. Ethical issues is critical in epidemiologic studies, identify the basic principles of ethics that guide studies dealing with human subjects 4mks

**SECTION B: 40MARKS: ANSWER ANY TWO QUESTION IN THIS SECTION**

30. Disease does not occur randomly but happen upon the disturbance of the balance of the elements within ecological niche. The elements interact in a variety of ways for disease to occur. Using Malaria as an example discuss the epidemiologic triad to explain disease causation 20mks

31. The preventive advantages of eating fish have reported in numerous studies. A recent cohort study reported that not eating fish increased the risk for stroke. The table below shows the results of the study:

		DISEASE STATUS		
		Cases of stroke	Non cases of stroke	TOTAL
Eating	Never	82	1549	1631

fish	Almost daily	23	779	802
Total		105	2328	2433

Determine:

- i. Incidence of disease in the un exposed 1mk
- ii. Incidence in the disease in the exposed 1mk
- iii. Incidence of the disease in the population 2mk
- iv. Attributable risk 2mk
- v. Attributable risk percent 2mk
- vi. Population attributable risk 2mk
- vii. Relative risk 3mk
- viii. Odds ratio 3mk
- ix. Prevalence of the disease 2mks
- x. Population attributable risk percent 2mks

32. A. Use the Table below to answer the questions that follow

County	Total Pop	Total Births	Total Females Ages 15-44	Total Females Ages 10-17	Births Ages 10-17
X	317,471	6,289	80,168	20,422	278
Y	182,827	2,808	56,869	16,869	213

For each of the counties, calculate the following:

- i. the crude birth rate 2mks
- ii. the crude fertility rate 2mks
- iii. the fertility rate for adolescents aged 10-17 2mks
- iv. the percent of total births to adolescents aged 10-17 2mks
- v. Do either County X or County Y have an excess of adolescent births? Which county is in more need of programs targeted at the adolescent population? 4mks

B. Discuss the challenges facing surveillance system and ways that can be used to enhance surveillance system 8mks