



# **MACHAKOS UNIVERSITY**

**University Examinations for 2020/2021**

**SCHOOL OF HEALTH SCIENCES**

**DEPARTMENT OF PUBLIC AND COMMUNITY HEALTH**

**SECOND YEAR FIRST SEMESTER EXAMINATION FOR**

**BACHELOR OF SCIENCE (PUBLIC HEALTH)**

**HPH 213: EPIDEMIOLOGY**

**DATE: 9/8/2021**

**TIME: 2:00 – 4:00 PM**

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## **INSTRUCTIONS:**

This paper consists of two sections A and B

Section A is compulsory

Section B choose any two (2) questions

## **SECTION A**

### **Specific Instructions**

- **This section has three subsections**
- **All subsections are Compulsory**
- **All subsections total to 30 marks**

## **MULTIPLE CHOICE QUESTIONS (10 Marks)**

Each question/statement below contains suggested answers. Circle the single best answer corresponding to each statement. Each question is worth one (1) mark.

1. 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.  
What type of study is this?
  - a) Case-control study
  - b) Ecological study
  - c) Cohort study
  - d) Cross-sectional study
  - e) None of the above
  
2. Which of the following is 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.
  - e) Not useful for any disease control programme.
  
3. Routine immunization of children against poliomyelitis is an example of which of the following
  - a) Primary prevention
  - b) Secondary prevention
  - c) Tertiary prevention
  - d) Quaternary prevention
  - e) All the above
  
4. For a disease such as Ebola fever, which is highly fatal and of short duration, which of the following statements is correct?
  - a) Incidence rate and mortality rate will be similar
  - b) Mortality rate will be much higher than incidence rate
  - c) Incidence rate will be much higher than mortality rate
  - d) Incidence will be unrelated to mortality rate
  - e) None of above

5. A good surveillance system should provide information about:
- Who is being infected
  - Where the infected individuals are
  - How rapidly infection is spreading
  - All of the above
  - a. and c. above
6. Which of the following marks the *beginning* of the *subclinical* stage of disease?
- exposure to the ultimate agent
  - first symptoms
  - diagnosis
  - resolution of symptoms
  - None of the above
7. Which of the following factors can lead to an epidemic?
- increases in susceptibility
  - environmental factors that favor propagation or retention of the agent
  - increases in the pathogenicity of agents
  - all of the above
  - None of the above
8. In a prospective study of a disease, the cohort originally selected consists of:
- Persons who are found to have the disease.
  - Persons without the disease.
  - Persons with the factor under investigation.
  - Persons with a family history of the disease.
  - Persons without the factor under investigation.
9. In Bakland, with a population of 3000, there were 50 cases of cholera and 30 deaths due to the disease during the year. The disease specific mortality rate for that year was
- 30/3000
  - 30/2950
  - 30/50
  - 50/3000
  - 50/2970

10. Prevalence rates are increased by all the following except
- Immigration of ill cases
  - Emigration of healthy persons
  - Immigration of susceptible cases
  - Prolongation of life cases
  - Death

**TRUE OR FALSE (3 MARKS)**

11. Identify which of the following statements are true and which are false
- Among all persons' variables, disease occurrence within a population varies most with age.
  - A decrease in the case fatality rate of a disease leads to an increase in the prevalence rate of the disease
  - Proportions and rates do not indicate the time that a given event occurs.
  - Disease occurrence within a given population is random.
  - Virulence refers to how fast a disease spreads in a population
  - The relative risk is the best measure to assess how much disease in a population could potentially be prevented by reducing exposure to that factor.

**SHORT/ANSWER QUESTIONS (EACH QUESTION IS 3 MARKS)**

12. Suggest why it is difficult to prevent diseases before they occur. (3 marks)
13. Explain the relationship between incidence and prevalence of an acute disease. (3 marks)
14. Outline three (3) disadvantages of case-control studies (3 marks)
15. Outline three (3) reasons why hospital records are not a good source of mortality and morbidity data. (3 marks)
16. Describe three criteria/conditions that must be certified for an agent to be said to cause a disease. (3 marks)
17. Differentiate between sensitivity and specificity in population screening. (2 marks)

## SECTION B

### Specific Instructions

- This Section has four (4) questions
- Answer any two (2) questions
- Each question is 20 marks

### QUESTION TWO (20 MARKS)

- a) Since the onset of Covid-19 disease, the Health Minister has been giving daily updates on the infection rates. Citing all relevant stakeholders, discuss the role the vital statistics play in fighting the disease. (10 marks)
- b) A study of gym members was undertaken to see if machine-users were more prone to injury than free-weight users. Assume for this study that you can only be injured in the gym once in your lifetime. 1500 gym patrons across the county were polled beginning January 1, 2003. On June 5, 2003, it was discovered that 75 of those gym patrons currently had gym-related injuries. After June 5, the remaining injury-free patrons were enrolled in a cohort study, classified as machine-users (n=1000) and free-weight users (n=425), and followed for 3 years. 85 machine-users and 15 free-weight users became injured in the 3 years. All follow-up stopped on exactly June 5, 2006. Assuming complete ascertainment and no drop-outs:
- Calculate the point-prevalence of injury on June 5, 2003 (5 marks)
  - Calculate the cumulative incidence of injury in the entire sample between June 5, 2003 and June 5, 2006 (5 marks)

### QUESTION THREE (20 MARKS)

- a) In Katoloni sub-county a total of 5856 children below five years were screened in the beginning of January 2009 and 1464 of them were confirmed to be goiter cases. During the month of January 2009 after screening, 355 of children died out of which 36 were among those who had goiter. The children were followed up for a period of one year. In December 2009, an additional 732 under-fives were confirmed as new goiter cases. Showing all your working
- Calculate the prevalence of goiter in the beginning of January and in December 2009? (4 marks)
  - What was the incidence rate of goiter between February and December of 2009 (2 marks)

- iii. What was the cause specific death rate (CSDR) for goiter that year. (2 marks)
  - iv. Assuming no other deaths were reported in the year, what was the crude death rate in Katoloni (2 marks)
- b) Explain why it is necessary to assess population characteristics before the formulation of a government health policy. (10 marks)

**QUESTION FOUR (20 MARKS)**

- a) Epidemiological studies have shown that a person's sex influences disease occurrence and that males have higher rates of illness and death than do females for many diseases. Discuss this in the context of the prevailing Covid-19 pandemic in Kenya. (10 marks)
- b) In the year 2020, village Y had a total population of 5,000 people. A group of 600 expectant mothers in the village were followed up during antenatal visits. Within the follow up period there were 400 deaths reported in the village of which 20 were from pregnant related complications. Of the pregnant women, 480 safely delivered, however only 420 of the children delivered celebrated their first birthday. Showing all your working;
- i. Calculate the crude death rate in the village in 2020 (3 marks)
  - ii. Calculate the maternal mortality rate in the year (3 marks)
  - iii. What was the infant mortality rate (4 marks)

**QUESTION FIVE (20 MARKS)**

- a) Explain the importance of studying epidemiology to a Public Health officer. (10 marks)
- b) Population screening is the application of rapid tests to populations to sort out those who probably have disease from those who don't have. Using the screening matrix as a basis, explain how this is done. (10 marks)