MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2013/2014

FOURTH YEAR SECOND SEMESTER EXAMINATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE IN MEDICAL LABORATORY SCIENCE AND MEDICAL BIOTECHNOLOGY WITH INFORMATION TECHNOLOGY

(MAIN CAMPUS)

PMT 422: PUBLIC HEALTH AND EPIDEMIOLOGY

Date: 7th April, 2014 Time: 8.30 – 10.45 a.m.

INSTRUCTIONS:

- **This paper consists of two sections, A and B. Section A consists of short answer questions (SAQ) and amounts to 40 marks.**
- **Section B constitutes long answer questions (LAQ) totalling to 30 marks.**
- **Attempt ALL questions in Section A.**
- **Answer ANY TWO other questions in Section B in the answer booklet(s) provided.**

SECTION A (40 MARKS) (ANSWER ALL QUESTIONS)

1. 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.

a. Calculate the overall attack rate in the community (2 marks)

b. Calculate the secondary attack rate in the affected households, assuming that only one case per household was a primary (community-acquired) case. (2 marks)

c. Is the disease distributed evenly throughout the population? (1 mark)

2. Specify five factors that can contribute to low prevalence of a disease (5 marks)

3. In a recent study of dental erosion in 5-year-old children, 202 healthy school-attending children were selected for study in Naivasha. The investigators recorded the erosion level on their maxillary deciduous incisors and whether or not their communities used fluoridated water. The results are summarized in the table below:

	Evidence of erosion	No evidence of erosion	**Total**
Flouridated Area	46	30	**76**
Nonflouridated Area	77	37	**114**
Total	**123**	**67**	**190**

a. What is the incidence rate of erosion over the five years for the two groups of children? (You may assume their teeth were free of erosion at birth.) (2 marks)

b. What is the rate difference between the fluoridated areas and nonfluoridated areas? (1 mark)

c. What is the relative risk for those in the nonfluoridated group? (Hint: The nonfluoridatedgroup are the exposed children.)(1 mark)

d. Based on your data above, does fluoridation appear to confer a risk of increased dental erosion or a protective tendency? Justify your response by appealing to the numeric value you calculated in part c.(1 mark)

4. Smoking and duodenal ulcers. The Health Professionals Follow-up Study is a prospective study of heart disease and cancer among more than 50,000 health professionals in the United States who were 40–75 years of age in 1986. Every two years questionnaires are sent to these individuals, and newly diagnosed cases of various diseases are reported. The following data are constructed from the surveys returned in the 1992 mailing. The investigators in this study were interested in the relationship between smoking status and duodenal ulcers, a common disorder of the gastrointestinal tract. The incidence of duodenal ulcers for three groups is presented below:

	No of persons at start of the study	No of observed new cases of duodenal ulcers
Non smokers	22295	60
Past smokers	20757	60
Current smokers	4754	16

a. Calculate the relative risks of being a past smoker and a current smoker, relative to never having smoked. (Hint: You should make two tables, one for smokers and one for past smokers.)

b. It is sometimes said by smokers, "The damage has been done, so I might as well keep smoking." Others believe that if they quit "right now" their risk will be decreased. Which view is supported by the relative risks you calculated above?

c. In your judgment, what values for the relative risks would support the opposite view from the one you believed was supported in part b?

5. Below are some hypothetical results from women who had a mammogram in Moi Teaching and Referral Hospital.

	Breast cancer	No breast cancer	Total
Positive mammogram	70	180	250
Negative mammogram	30	720	750
Total	100	900	1000

a. What is the sensitivity of the mammogram? (1 mark)
b. What is the specificity of the mammogram? (1 mark)
c. Calculate the Predictive Value for a Positive Result (1 mark)
d. Calculate the Predictive Value for a NegativeResult (1 mark)
e. Calculate the Likelihood Ratio (1 mark)
6. Outline five uses of Epidemiology (5marks)
7. Enumerate five circumstances that may trigger an epidemic (5 marks)
8. Draw a schematic diagram of the natural history of diseases and their expected outcomes (5 marks).

SECTION B (30 MARKS) (ANSWER ANY TWO)

9. Discuss the criteria for effective screening (15 marks)
10. Using relevant examples, describe modes of disease transmission (15 marks)
11. Discuss the rationale behind the increase of emerging and reemerging infections (15 marks)