W1-2-60-1-6

JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

UNIVERSITY EXAMINATIONS 2023/2024

EXAMINATION FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN EPIDEMIOLOGY & BIOSTATISTICS, PUBLIC HEALTH & GLOBAL HEALTH

PEH 4100: ADVANCED QUANTITATIVE

DATE: AUGUST 2023 **TIME: 3 HOURS**

INSTRUCTIONS: Answer ALL Questions – 25 Marks Each

Question 1a: Discuss the types of mixed methods study designs, outline key strengths and limitations of each approach (5 marks)

Question 1b: Discuss the steps and considerations you would take to estimate a sample size for a cross sectional study to estimate the prevalence of COVID-19 in Nairobi County Kenya (10 Marks)

Question 1c: Discuss the components on research methodology of a proposal (Chapter 3) 10 Marks

Question 2: Suppose investigator plans to perform an experimental study amongst elderly subjects to examine if aspirin decreases the risk of developing Alzheimer's disease. Discuss in detail how the investigator can conduct this study (25 marks)

Question 3: Sample size calculation is a major huddle for most researchers who wish to conduct studies. Giving an appropriate example of case control study , discuss the process of determining the sample size and discuss both ethical and scientific considerations involved in the example provided (25 marks)

Q4a: Define the following terms give appropriate examples

1. Define Epidemiology (4 marks)
2. Discuss four "roots" of modern epidemiology (4 marks)
3. What is the difference between disease, illness and sickness? (4 marks)

Q4b: a Define Maternal Mortality rate (4 marks)

b. Define Infant Mortality rate (4 marks)

c. Define bias and give two examples (5 marks)

Q5 Read and answer the folloing questions (25 marks)

"A Norwegian comedian Marve Fleksnes once stated: I am probably allergic to leather because every time I go to bed with my shoes on, I wake up with a headache the next morning.".

Assume you wuish to use this information to conduct an epidemiploical study

1. State the exposure (2 marks)
2. State the outcome (2 marks)
3. State the null and alternative hypothesis (4 marks)
4. State a possible confounding factor in this study (3 marks)
5. State 5 ways that can be used to control for confounding factors (10 marks)
6. State the possible features for the selected study design (4 marks)

Q6: The following tables display the relationship between current smoking and the incidence death during 24 years of follow-up from the FHS teaching dataset

	death		**Person years**
	+ve	**-ve**	
Smokers	**788**	**1393**	44,440.38
Non smokers	**762**	**1491**	46,675.20

a. Use the information in the table to answer the following questions: Calculate

1. Odd ratio (2 marks)
2. Estimated risk amongst smokers (1 mark)
3. Relative Risk (2 marks)
4. Estimated risk amongst non-smokers (1 mark)
5. Incident rate ratio (per 10,000py) (3 marks)
6. Prevalence of smoking (1 mark)

b. For each of the ratios calculated in Q7, interpret the results explain what the results mean in epidemiology (15 marks)