UNIVERSITY OF ESWATINI
Faculty of Health Sciences
Department of Environmental Health Science

DEGREE IN ENVIRONMENTAL HEALTH SCIENCE

MAIN EXAMINATION PAPER 2019

TITLE OF PAPER	:	FUNDAMENTALS OF EPIDEMIOLOGY
COURSE CODE	:	EHS207
DURATION	:	2 HOURS
MARKS	:	100
INSTRUCTIONS	:	READ THE QUESTIONS & INSTRUCTIONS CAREFULLY
	:	**QUESTION ONE IS COMPULSORY** THEN ANSWER ANY OTHER THREE QUESTIONS
	:	EACH QUESTION **CARRIES 25** MARKS.
	:	WRITE NEATLY & CLEARLY
	:	NO PAPER SHOULD BE BROUGHT INTO THE EXAMINATION ROOM.
	:	BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.
	:	**INDICATE YOUR PROGRAM**

DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR.

QUESTION 1

a) Using the natural history of a disease, discuss the four types or modes of prevention stating one example for each. This should be discussed in alignment with the natural history of a disease. [10]

b) In epidemiology, 2 approaches are used in the prevention of diseases.

    i)   Name these 2 approaches and give an example for each. [4]

    ii)   State 2 advantages and 2 disadvantages of each approach. [8]

c) Discuss a case cross over study design. [3]

[25 MARKS]

QUESTION 2

The Tuberculosis (TB) program has noticed an increase in the number of new TB cases in the Manzini region. The past three months has seen the region receiving a total of 247 cases. Previously, the region records on average 30 to 50 cases per month. This has led them into conducting a study to ascertain the factors associated with this escalating number of cases. One of the factors revealed by the study was location of these cases. Most of the cases were reported to be currently residing in one of the industrial towns of the region. The program then resolved in conducting an in-depth study to ascertain the intensity of this health concern. They grouped study samples in terms of location (industrial and non-industrial place). A total of 382 cases were selected. There were 421 people (study population) from the industrial town and of this 211 of these tested positive of TB. In total 733 people were selected for this study.

a) What is the epidemiological term given to new cases? [1]

b) What do we call the 30 to 50 monthly cases in epidemiology? [1]

c) What study design was used by the program? Explain [3]

d) Name 2 advantages of this study? [2]

e) Discuss 2 types of biases associated with this study. [4]

f) Should there be an association in such studies, what further study should be conducted? [2]

g) Name 2 advantages and 2 disadvantages of the study mentioned in (f). [4]

h) Represent the study findings in a 2x2 table.   [4]

i) Is there an association between location and testing positive for TB? Show all the relevant calculations.   [4]

[25 MARKS]

QUESTION 3

Social media access has been drastically improving in the country. This has led Organization Y taking an advantage of this innovation to introduce a new program aimed at increasing access to sexually reproductive health information to adolescents. The organization aims at scaling this project to other sites in the country as they are currently concentrating in the urban areas. The program is a three year project and after the 3 years, a study will be conducted in relation to the project success.

a) What type of study will be conducted? Explain.   [3]

b) What are the assumptions of this study design? Discuss two.   [4]

c) What is the main disadvantage of such a research program? Explain.   [2]

d) Researchers have however criticized the program stating that social media access is a necessary but not sufficient factor.

   i. Explain what the statement above means.   [3]

   ii. Another researcher noted that access to social media is a sufficient but not necessary factor. Explain this.   [3]

   iii. Discuss 5 guidelines for judging causality (causal associations) that are relevant to this program.   [10]

[25 MARKS]

QUESTION 4

Scientists have come up with drug that is believed to have better results and fewer side effects compared to the currently being used drug. This claim comes after the scientists conducted a study without comparison.

a) Explain the meaning of study without comparison.   [2]

b) What is the main disadvantage of this study? [2]

After careful consideration, epidemiologist resolved that to prove this claim, a study has to be conducted whereby these two drugs will be tested for their effectiveness. Observing all ethical considerations, two groups of study population were randomly selected. These were further grouped by age.

c) What study design is this? Explain your answer. [3]

d) The researchers decided that to further prove the effects of these two drugs, a crossover should be considered.

   i. Define crossover. [2]

   ii. Discuss the 2 types of crossover stating the cautions to be taken in terms of the crossover. [5]

e) A total of 2695 from the old drug were enrolled into the study and 20% of them did not improved in terms of health status. Regarding the new drug, 1065 were enrolled and 17.84% did not improve in terms of health status as a result of the disease.

   i. Represent the finding of the study in a 2x2 table. [4]

   ii. Is there a significant effect of the new drug on treatment of the disease compared to the old drug currently being used? [4]

   iii. It was reported that for data collection purposes, the study was a double blinded study. Explain what this means. [3]

[25 MARKS]

QUESTION 5

Last year, the country introduced a new Act aimed at curbing the escalating cases of violence in the country especially gender based violence. However, there has been mixed feelings about the Act by many people. Some even claim that the Act has resulted into the country's judicial system having a reduced increased sensitivity and thus resulting to overcrowding in the local correctional institutions. A study was conducted therefore to ascertain the validity of the Act. A total of 564 people who appeared in the high court were enrolled in the study. These people were assured of

confidentiality and asked if they really committed the crime or not. This was test the ability of the Act to "sentence to prison" those who have indeed committed the crime. Of the 564, 416 were sentence to prison as per the Act. Of the ones sentenced to prison, 187 were said to have committed the crime as per the Act while those not "sentenced to prison", 98 were found by the Act to have not committed the crime and not sentenced to prison.

a) Represent these findings in a 2x2 table. [4]

b) What does validity means? [2]

c) How is validity different from reliability? [3]

d) What is meant by sensitivity? [2]

e) Calculate the sensitivity of the Act. [2]

f) What is the specificity of the Act? Show all the calculations. [2]

g) Calculate the positive predictive value of the Act. [2]

h) However, the study has been associated with a number of biases. Discuss 2 types of biases associated with the study and explain how they could have been prevented. [6]

i) The Act was initially meant to control the increasing incident of GBV related mortalities. The case fatality has been reported to have been increasing in the past 5 years. What is meant by case fatality? [2]

[25 MARKS]