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

DEGREE IN ENVIRONMENTAL HEALTH SCIENCE

RE-SIT EXAMINATION PAPER 2017

TITLE OF PAPER	:	FUNDAMENTALS OF EPIDEMIOLOGY
COURSE CODE	:	EHS 207
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
	:	INDICATE YOUR PROGRAMME IN YOUR ANSWER SHEET COVER PAGE
	:	NO PAPER SHOULD BE BROUGHT INTO THE EXAMINATION ROOM.
	:	BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.

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

QUESTION 1

According to the recent news update, the rate of teenage pregnanciesin School X is increasing more especially amongst Form 5 students. It was also reported that between 2010 and 2014, a total of 16 students dropped out of school whereby 8 were as a result of pregnancy. Only 1 pregnancy related dropout was from the lower classes. Between these years the school has had a stable population of 600 studentswith 450 girls and only 45 girls doing Form 5. In 2015, out of the 80 Form 5 students (53 girls), 9 dropouts were pregnancy related while the other 3 were due to other reasons. In the entire school, there were 23 dropouts and 16 were pregnancy related.

a) Describe the above scenario using descriptive epidemiology. [3]

b) What is the epidemiological terms used to describe the rate of pregnancy related dropouts between 2010 and 2014? Explain your answer [3]

c) During the speech and prize giving day at the school, the principal noted that the risk of getting pregnant in Form 5 was high in this school. He therefore requested parents to be vigilant when it comes to this issue more so because Form 5 is a crucial class in the future of the students.

   What is the meaning of the word 'risk'? Give the formula used to calculate risk andexplain its importance in epidemiology. [4]

d) Calculate the prevalence rate of dropout amongst student from School X between 2009 and 2014 [3]

e) What is the prevalence rate of pregnancy related dropouts amongst the form 5 in 2015? [3]

f) What are the possible explanations for what was happening between 2010 and 2014? [5]

g) From the above report, it can be concluded that between 2010 and 2014, the ratio of boys to girls in this school is normal as compared to other schools in the area.

   i. What is meant by the word ratio? [2]

   ii. Calculate the ratio of girls to boys in School X. [2]

[25 marks]

QUESTION 2

At least 70 people attending a national conference in a city in Epis became ill with what appeared to be food poisoning. Three hospitals in the area treated and discharged 48 attendees who complained of nausea and vomiting; others with similar symptoms were hospitalized overnight. A health official noted that all of the patients had eaten lunch on the previous day at the same hotel. The hotel's lunch menu included roast chicken, roast beef, and a vegetable pasta dish. Because some of the people who became ill were vegetarian, there was particular interest in determining whether the pasta dish might have been contaminated. At the time of the report, health officials were still looking for the source of the outbreak. The hotel was cooperative in the investigation and voluntarily halted food service at the hotel.

a) Explain why you might consider this problem important enough to investigate. Give at least three reasons for investigating. [3]

b) Briefly describe the first step that you would take in investigating this problem. Indicate the type of data needed to accomplish this step and give examples of sources of such data. [5]

c) It was further revealed that earlier on one of the chefs had the same symptoms but was released to hospital after preparing the lunch. Further investigation revealed that 3 hours after eating the lunch, 4 people complained of the above symptoms followed by 6 in a space of 30 minutes then after another 30 minutes, 13 attendees had the same complain followed by 7 in a space of an hour apart then another 8 attendees came with the same symptoms after 30 minutes. Thirty minutes apart another 7 and 3 attendees reported of symptoms respectively.

   i) Represent this information in an epidemic curve. [8]

   ii) What can you say about the chef in this scenario? Explain your answer. [2]

d) It was also revealed that there were 12 vegetarians in the group, of which 7 reported the symptoms stated above.

   i) Represent this information in a 2x2 table. [4]

   ii) Calculate the relative risk of developing symptoms of food poisoning among those that ate the pasta and being a vegetarian. [3]

[25 marks]

QUESTION 3

A study to estimate association between low birth weight and mothers history of emotional abuse during pregnancy period was conducted in Epicountry in 2005. A total of 1562 new-borns (1 child per mother) were enrolled in the study. History of abuse was asked from the mother by the researcher. A total of 978 new-borns had a low birth weight. A total of 783 mothers reported to have had been emotionally abused during their pregnancy. And from these mothers only 672 had babies with low birth rate.

a) Represent this in a 2x2 contingency table. [6]

b) Calculate the association between low birth weight and mother to have been emotionally abused during pregnancy. (Hint; RR and OR) [6]

c) The study was critiqued my some researcher to be vague because there could be other confounders and some sort of bias resulting to this observed association.

   i) What sort of bias is associated with this study? Explain your answer. [3]

   ii) How could this bias in (i) be avoided with regard to this study? [3]

   iii) Define the meaning of a confounder. [3]

   iv) What are the necessary conditions for confounding? [4]

[25 marks]

QUESTION 4

a) There two things that distinguishes the duties of public health specialists or epidemiologist and clinicians are what is being studied and the research goals. This is also observed in basic since.

   i) Discuss what distinguishes public health specialists and clinician. [4]

   ii) In terms of settings i.e. where the actual work is done, how is public health different from basic science? [5]

   iii) Discuss the three kinds of epidemiology. [6]

   iv) What are the objectives of epidemiology? [5]

   v) Epidemiology can be used in studying the natural history and prognosis of diseases. Discuss this in-depth. [5]

[25 marks]

QUESTION 5

A survey conducted by the Ministry of Health in Country Y indicted that Tuberculosis (TB) prevalence rate was increasing as compared to the previous three years. This increase was associated with the HIV/AIDS pandemic. In the previous three years the prevalence rate of TB was less than 5% in the total population. However, the recent survey indicated that it has increased to an alarming 8% amongst people living with HIV and approximately 5.4% in the total population. It was therefore suggested that a new machine to conduct the sputum smear test should be purchased. According to the supplier, the sensitivity of this machine is 95% whilst the specificity is 90%. The supplier further confirmed that the reliability and validity of the machine was assured through a number of scientifically proven methods. It was thereafter suggested that to curb the situation every person living with HIV should be tested for TB. There are 1682 persons living with HIV in the country.

a) Define the following epidemiological terms used above:
   i. Pandemic [2]
   ii. Reliability [2]
   iii. Validity [2]
   iv. Sensitivity [2]
   v. Specificity [2]

b) The tests were conducted using the new machine. Sputum samples were taken from all the persons living with HIV. Illustrate the findings of the new machine using a 2x2 table. (Prevalence rate of TB amongst 1682 HIV positive people is 8%, specificity is 90% and sensitivity is 95%). [10]

c) Calculate the positive predictive value of the test. [2]

d) A number of suppliers showed interest in selling the sputum test machines to the Ministry. However, the Ministry chose the above supplier because of the sensitivity of its machine. Why was the Ministry concerned with the sensitivity of the machine? [3]

[25 marks]