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

DEGREE IN ENVIRONMENTAL HEALTH SCIENCE

FINAL EXAMINATION PAPER 2016

TITLE OF PAPER	:	FUNDAMENTALS OF EPIDEMIOLOGY
COURSE CODE	:	EHM 203
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.

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

QUESTION 1

In 2015, in Countryside, a study aimed at establishing if coffee drinking amongst smokers causes lung cancer, was conducted. A total of 530 lung cancer patients were enrolled in this study. These patients were retrieved from the country's special cancer registry. A total of 340 patients reported to be heavy coffee drinkers. The level of coffee drinking was measured by the number of 300ml coffee cups per day using the following scale: above 3= heavy, below 3= normal. The study revealed that amongst the heavy coffee drinkers, 210 were smokers and only 100 were smokers amongst the normal coffee drinkers.

a) What type of study design is this? Explain your answer [3]
b) Give 2 advantages and 2 disadvantages of this study design. [8]
c) Present the information given in a 2 x 2 contingency table. [4]
d) Using appropriate epidemiologic measures, determine if coffee drinking is associated with lung cancer. [6]
e) What could be the possible explanation for the association? [4]

[25 marks]

QUESTION 2

A factory in Greytown has 175 employees who are involved in the day-to-day duties of the factory. Recently this year, two weeks prior, there were complaints of episodes of diarrhoeal diseases. A number of employees were treated and discharged from the factory clinic. It was reported that such episodes were also observed the previous year approximately around the same time of the year. What was alarming was the increase in the number of cases this current year. Further analysis revealed that such diarrhoeal episodes have been happening for the past 4 years, except that this year (2016) almost all employees were affected, except for one who was reported to be on leave during the time of the diarrhoeal episodes. The following data on the episodes were retrieved:

Table 1: Four Years Episodes of Diarrhoea in Graytown Factory

Time of episode	Total number affected	Day 1	Day 2	Day 3	Day 4
Dec 2013	54	18	12	17	7
Dec 2014	53	29	17	7	
Dec 2015	54	30	20	4	
Dec 2016	74	32	23	19	

a) Using descriptive epidemiology, explain the above current scenario. [3]

b) What is the epidemiologic term used to describe the prevalence of diarrhoea among the factory workers between 2013 and 2015? Explain your answer [2]

c) Represent the above scenario in an epidemic curve [8]

d) What sort of outbreak is this one? Explain your answer [2]

e) It was revealed that information dating before 2013 could not be ascertained as there was no surveillance system by then.

i) What is meant by the word "surveillance"? [3]

ii) What are the objectives of a surveillance system? [7]

[25 marks]

QUESTION 3

According to World Health Organization (WHO, 2016), the worldwide prevalence of obesity doubled between 1980 and 2014. In 2014, more than 1.9 billion adults aged 18 years and older were overweight. Of these, over 600 million adults were obese. Overall, about 13% of the world's adult population (11% of men and 15% of women) were obese in 2014. Thirty nine per cent of adults aged 18 years and over (38% of men and 40% of women) were overweight. Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. This has been associated with a number of factors.
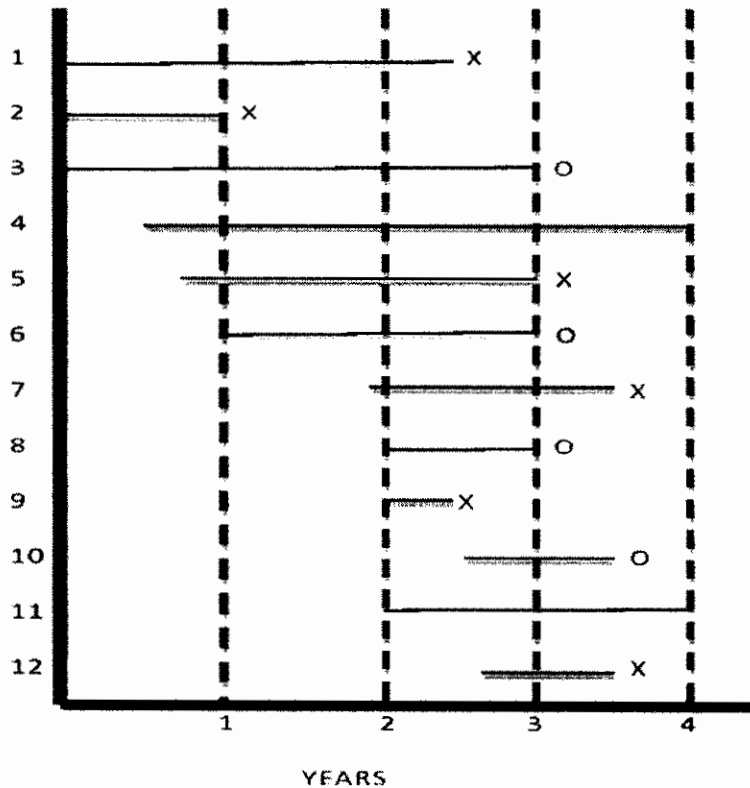
a) What is meant by the term 'prevalence"? [2]

b) From the WHO newsletter, it can be observed that obesity is affecting the whole world. What is the epidemiological term used to describe a health problem that affects the world? [2]

c) Using the epidemiologic triad, explain the obesity epidemic giving two examples of each factor involved in the triad. [6]

d) The global statistics on obesity and overweight have led to countries conducting epidemiologic investigations

    i)   Discuss the objectives of the epidemiological investigations. [6]

    ii)   Discuss the three preventative modes that can be used to address the problem of overweight and obesity. Use appropriate examples for each. [9]

[25 marks]

QUESTION 4

A four year study was conducted to estimate the use of alcohol by high school students. A total of 12 students were enrolled in the study. Four students left the study. The following graph demonstrates the findings of the study. (X= started drinking alcohol and O= left study). The horizontal lines represent the length of the period in years when the 12 students were followed up.

YEARS

a) What study design is illustrated above? Explain. [3]

b) Give two advantages of this study design? [2]

c) What is the incidence of drinking alcohol in the four year follow up period? [3]

d) Calculate the person total-years contributed by the students in the four year follow up period. [3]

e) What was the incidence of drinking alcohol on the third year? [2]

f) According to the Surgeon Report (2007), the increase in adolescent uptake of alcohol is associated with an increase in risk-taking, sensation-seeking, and erratic behaviour that follows the onset of puberty and which contributes to violence, unintentional injuries, risky sexual behaviour, homicide, and suicide. As an epidemiologist you were expected to predict if there is any causal relationship between alcohol drinking and the above mentioned outcomes. The following were the construct of your discussion. Discuss them in-depth using appropriate examples:

    i)   Dose- response relationship [3]

    ii)   Consistency [3]

    iii)   Biological plausibility [3]

    iv)   Sufficient cause [3]

[25 marks]

QUESTION 5

A study was conducted to investigate the association of taking energy drink and obtaining higher grades. This study was conducted amongst the second year Environmental Health students. Out of the total of 92 students (45 boys and 47 girls), 56 (40 girls and 16 boys) used energy drink. It was revealed that amongst those who used energy drinks, only 37 (23 girls and 14 boys) obtained higher grades in their epidemiology test.

    a)   What study design is this? Explain [2]

    b)   Name two advantages and two disadvantage of this study   design. [4]

c) Illustrate the association between taking energy drink and obtaining higher grades among the two sexes in the epidemiology class using a 2x2 table. [4]

d) Would you say energy drink is associated with obtaining higher grades in epidemiology amongst the Environmental Health students? Hint: calculate the odds ratio of taking energy drink and obtaining higher grades. [3]

e) Using the three epidemiological measures of association, calculate the association of being a boy who took energy drink and performed better in the epidemiology test vis-a-vis of being a girl that takes energy drink and performs better in the epidemiology test. [9]

f) The findings of the study could be confounded though. Name three possible cofounders that need to be considered by the researchers. [3]

[25 marks]