UNIVERSITY OF ESWATINI

FACULTY OF HEALTH SCIENCES

DEPARTMENT OF COMMUNITY HEALTH NURSING SCIENCE

MAIN EXAMINATION

AUGUST, 2020

COURSE TITLE: COMMUNITY HEALTH NURSING IV (EPIDEMIOLOGY)

COURSE CODE: NUR 521

TIME ALLOWED: 2 HOURS

MARKS: 75

Number of pages including the cover page: 7

INSTRUCTIONS:

1. THERE ARE TWO SECTIONS IN THIS PAPER.
2. SECTION A COMPRISES OF MULTIPLE CHOICE QUESTIONS.
3. SECTION B COMPRISES OF CALCULATIONS AND SHORT ESSAY QUESTIONS.
4. ANSWER ALL QUESTIONS FROM THE TWO SECTIONS

DO NOT OPEN THIS PAPER UNTIL YOU ARE TOLD TO DO SO

SECTION A: MULTIPLE CHOICE QUESTIONS

For each of the following questions, write down the letter that indicates the best answer out of the given options by writing the question number and the letter representing the answer; e.g. 27. A.

1. Endemic means that a disease / health determinant
   A. exhibits a seasonal pattern
   B. affects a large number of countries simultaneously
   C. habitually present in human populations
   D. occurs clearly in excess of normal expectancy (1)

2. Assessment of the risk of infection according to "place" is necessary to
   A. interview the number of persons who have been selected to be controls
   B. prepare a spot map of the cases by a "place" variable that produces a meaningful pattern
   C. prepare an epidemic curve for the cases in each different "place"
   D. calculate incidence rates for component sites of various places (1)

3. In a cohort study, the advantage of starting by selecting a defined population for study before any of its members become exposed, rather than starting by selecting exposed and non-exposed individuals, is that
   A. the study can be completed more rapidly
   B. a number of exposures can be studied simultaneously
   C. a number of outcomes can be studied simultaneously
   D. the study will cost less to carry out (1)

4. In Epidemiology, the phrase "population at highest risk of infection" is often used to describe group of persons who have
   A. A low level of resistance, whether it results from the existing disease, a naturally or artificially depressed immune response system, or some other course
   B. Never had the disease
   C. Particular behaviour patterns
   D. Greatest susceptibility and greater likelihood of contact with the source of infection (1)

5. Which one of the following best describes the difference between a common point source outbreak and a propagated outbreak?
   A. All cases in a common point source outbreak occur within one incubation period of the exposure
   B. The attack rates in propagated outbreaks are higher
   C. Person-to-person transmission is a feature of common source outbreaks
   D. The source of infection in propagated outbreaks is more easily contained than in common source outbreaks (1)

6. An outbreak is best defined as:
   A. A breach of lab security leading to viral contamination
   B. The occurrence of a greater than expected prevalence of illness based on at least 3 years experience
   C. Any significant increase in the occurrence of a communicable disease
   D. An increase in the number of cases of an illness compared to past experience for a given population, place and time (1)

7. Which one of the following is NOT typical of a common source epidemic?
   A. Epidemic curve that usually shows a single, sharp peak
   B. When the same source is intermittent, it may mimic a propagated epidemic
   C. Is generally transmitted from person to person
   D. Is easy to control (1)

8. The property of a test to identify the proportion of truly ill persons in a population who are identified as ill by a screening test
   A. Sensitivity
   B. Specificity
   C. Positive predictive value
   D. Negative predictive value (1)

9. The probability of a person having the disease when the test is positive
   A. Sensitivity
   B. Specificity
   C. Positive predictive value
   D. Negative predictive value (1)

10. The extent to which a test is measuring what it is intended to measure is the test's
    A. reliability
    B. validity
    C. sensitivity
    D. specificity (1)

11. The health inspector working at Motsahne clinic tells you that in collaboration with laboratory technicians, a new serological test has been developed for diagnosis of bovine paratuberculosis. The health inspector then tell you that the test has since been used on 200 dairy cattle known to be infected with bovine paratuberculosis based on isolation of Mycobacterium paratuberculosis from faecal samples, and 300 dairy cattle designated free of disease. Among the 200 dairy cattle known to be infected with bovine paratuberculosis, 120 had a positive test and 80 had a negative test. Among the 300 dairy cattle designated free of bovine tuberculosis, 30 had a positive test and 270 had a negative test. The health inspector is requesting you to help him determine the sensitivity of the serological test. You tell him that the sensitivity of the serological test for detecting bovine paratuberculosis is .....
    A. 90%
    B. 80%
    C. 60%
    D. 40% (1)

12. A study was made of a clinician's ability to diagnose streptococcal throat infections in 149 patients coming to the emergency department in a certain hospital. The doctor's clinical impressions were compared to results of throat cultures or group A streptococcus. 37 patients had positive throat cultures and 27 of these were diagnosed by doctor as having strep throat. 112 patients had negative cultures, and the doctors diagnosed 35 of these as having strep throat. The specificity of the doctors' clinical judgment was:
    A. 27/37
    B. 77/112
    C. 27/62
    D. 10/87 (1)

13. From the study in Question 12, the predictive value of the doctors' clinical judgment for streptococcal sore throat was:
    A. 27/37
    B. 77/112
    C. 27/62
    D. 10/87 (1)

14. A screening test of known sensitivity and specificity is applied to two populations. The prevalence of the disease being screened for is 10% in population A and 1% in population B. Which of the following is true?
    A. The percentage of all positive tests that are false positives will be lower in population A than in population B. The prevalence of disease is higher in population A thus there will be more true positive results and a lower proportion of false positive results.
    B. Because there are more people with disease in population A there may also be more false negative results
    C. Specificity and sensitivity are properties of the test and do not vary with the prevalence of disease.
    D. None of the above (1)

15. Which of the following best measures the association between exposure and outcome?
    A. The incidence rate
    B. The attributable risk
    C. Relative risk
    D. The population attributable risk (1)

There are 4 types of causal relationship; A. necessary and sufficient; B. necessary but not sufficient; C. sufficient but not necessary; D. neither sufficient nor necessary. Select an appropriate one for each example of the following:

16. Tubercle bacillus is a ..... factor for tuberculosis (1)
17. Radiation exposure is a ..... factor for leukemia (1)
18. Treponemapallidum.....syphilis (1)
19. Skin contact with a strong acid.....burn (1)
20. Rhesus negative.....foetal destruction (1)

For each of the following situations, identify whether it reflects:

A. Sporadic disease
B. Endemic disease
C. Hyperendemic disease
D. Pandemic disease
E. Epidemic disease

21. Twenty two (22) cases of legionellosis occurred within 3 weeks among residents of a particular neighbourhood (usually 0 or 1 per year) (1)
22. Average annual incidence was 364 cases of pulmonary tuberculosis per 100,000 population in one area, compared with national average of 134 cases per 100,000 population (1)
23. Over 20 million people worldwide died from influenza in 1918–1919 (1)
24. Single case of histoplasmosis was diagnosed in a community (1)
25. About 60 cases of gonorrhoea are usually reported in this region per week, slightly less than the national average (1)

[Total marks = 25]

SECTION B: SHORT ESSAY QUESTIONS AND CALCULATIONS

Question 1

A. A random sample of 2500 adult males free from chronic heart disease (CHD) from a defined geographical area was selected in a particular study. These males' exercise habits were assessed by a questionnaire and were followed up for 5 years for development of CHD. Out of the 2500 males, 1000 were reported to engage in regular exercise while 1500 do not exercise. Of those who exercise, 170 developed CHD over the duration of the study and 360 developed CHD among those who do not exercise. Is exercise related to a decreased risk of CHD? (12 marks)

B. For each of the following, indicate whether it is a ratio, proportion or a rate (7 marks)

i. Attack rate
ii. Relative risk
iii. Period prevalence
iv. Proportionate mortality
v. Secondary attack rate
vi. Point prevalence
vii. Case fatality rate

C. Discuss the concept "screening" as utilised in epidemiology (6 marks)

[Total marks = 25]

Question 2

In an outbreak of an infection in a large office block where 1400 people worked, 31 cases were identified among employees and 6 cases among staff at the cafeteria. Only 3 of these 37 cases actually went to a health facility because of symptoms. The rest were found by culturing of stools or by interviewing for symptoms. To compare risk factors with people who had been ill, 58 randomly chosen employees who denied having had any symptoms were given the same questions as the 37 cases. From the dates of the first, and from the knowledge of the incubation period of the infection, it was suspected that the infected food had been served on the 23rd of January, 2016. The following questions were asked in the investigation:

- Did you have lunch in the cafeteria on 22 January?
- Did you have lunch in the cafeteria on 23 January?
- Did you eat salad or any on any of these days?
- Did you eat sandwiches?
- Did you eat chicken?

The responses to the questions above are shown in the table below:

Results of questionnaires given to 37 cases and 58 controls in an outbreak of gastroenteritis in a large office block

Item	Gastroenteritis		No Gastroenteritis	
	Eaten	Not eaten	Eaten	Not eaten
Lunch 22 January	6	31	9	48
Lunch 23 January	18	19	14	43
Salad	12	24	5	52
Sandwiches	16	21	14	44
Chicken	4	33	5	54

(Source: Maz et al., 2015)

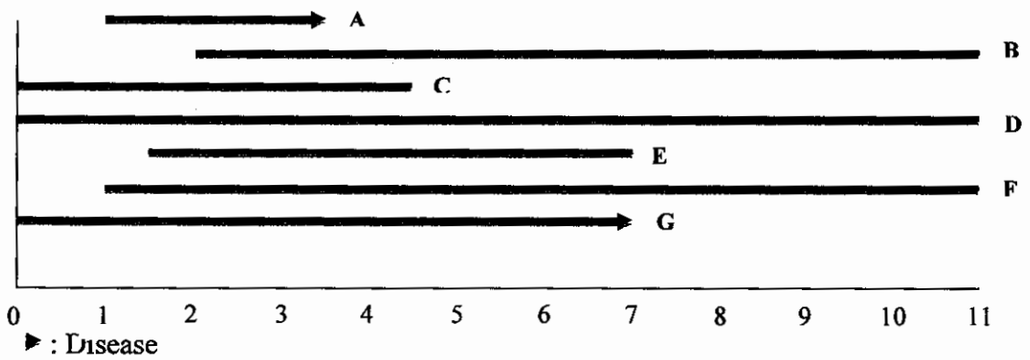
a) Using the odds of disease in the cases and controls, calculate the odds ratio in the two groups (exposed and unexposed) for each item and determine which of the items could be associated with gastroenteritis (15 marks)

b) Describe the epidemiologic study design used in the given scenario and justify your answer. (3 marks)

c) Comment on the selection of study groups and rationalise your comment. (3 marks)

d) Find a question with 7 marks to make a total of 50 marks in section B

The figure below illustrates the follow-up in years of 7 participants of cohort study.



► : Disease

i. Describe the cohorts of subjects A, C, F (3 marks)

ii. Calculate the total number of person-years contributed by the participants in this study? (2 marks)

iii. What was the prevalence of disease in the study? [use n=2] (1 mark)

iv. What is the incidence of disease in the study? [use n=5] (1 mark)

[Total marks = 25]