BONDO UNIVERSITY COLLEGE

UNIVERSITY EXAMINATIONS 2012/2013
FIRST YEAR FIRST SEMESTER EXAMINATIONS FOR THE DEGREE OF MASTER OF PUBLIC HEALTH

KISUMU/ KISII LEARNING CENTRES

COURSE CODE: HMP 5112
TITLE: PRINCIPLES OF EPIDEMIOLOGY

DATE: 17/12/2012 **TIME: 8.00-11.00AM**

DURATION: 2 HOURS

INSTRUCTIONS

1. Write your University Registration Number on every booklet that you use
2. Do not write your name on any paper you use.
3. This paper consists of THREE SECTIONS
4. Read carefully the additional instructions preceding each section

<u>SECTION A:</u> MULTIPLE CHOICE QUESTIONS (25 marks)
For this section, Only ONE response is correct. <u>Circle</u> the correct response.

1. What is an appropriate measure of statistical association in a cohort study involving person-time rates?
   A. Rate ratio
   B. Odds ratio
   C. Risk ratio
   D. Cumulative incidence

2. Which of the following measures is conditioned on having a positive test?
   A. Sensitivity
   B. Specificity
   C. Predictive value positive
   D. Predictive value negative

3. The timing of a case control study is:
   A. Forwards
   B. Backwards
   C. Either
   D. Neither

4. How would you classify an epidemic with a curve that rises rapidly, peaks and then decreases gradually?
   A. Point source
   B. Propagated
   C. Continuous source
   D. Intermittent source

5. Which study design is appropriate for determining the incidence of disease?
   A. Ecological study
   B. Cross-sectional study
   C. Case-control study
   D. Cohort study

6. The following are proportions EXCEPT:
   A. Attack rate
   B. Cumulative incidence
   C. Incidence rate
   D. Prevalence

7. The natural course of a communicable disease involves a susceptible host, a point of exposure, a subclinical disease phase, a clinical phase, and a phase of recovery, disability or death. Which phase is related to the latency period?
   A. Susceptibility phase
   B. Subclinical phase
   C. Clinical disease phase
   D. Recovery, disability or death phase

8. Which one of the following best defines specificity?
   A. Proportion of people with a negative test who do not have the disease
   B. Proportion of people with the disease who have a positive test
   C. Proportion of people without the disease who have a negative test
   D. Proportion of people with a positive test who have the disease

9. Which of the following terms refers to a persistent, expected level of disease in a defined population?
   A. Epidemic
   B. Outbreak
   C. Endemic
   D. Pandemic

10. The following are measures of association EXCEPT:
   A. Relative risk
   B. Odds ratio
   C. Attributable risk
   D. Cumulative incidence

11. Which of the following designs is best suited if the exposure is extremely rare?
   A. Cross-sectional
   B. Prospective cohort
   C. Retrospective cohort
   D. Case-control

12. All the following have live births as denominator EXCEPT?
   A. Maternal mortality ratio
   B. Neonatal mortality rate
   C. Perinatal mortality rate
   D. Infant mortality rate

13. Which of the following best defines lead-time bias?
   A. The screening test looks better than it actually is because younger, healthier people are more likely to get the test
   B. Screening identifies an illness that would not have shown clinical signs before death from other causes
   C. Difference in the time between the date of diagnosis with screening and the date of diagnosis without screening that, if counted in the survival time of patients, will give a misleading picture of the benefits of treatment
   D. Slow-progressing cases of disease with a better prognosis are more likely to be identified than faster-progressing cases of disease with a poorer prognosis. Thus, cases diagnosed through screening tend to have a better prognosis than the average of all cases.

14. A double-blind study of a vaccine is one in which:
   A. The study group receives the vaccine and the control group receives a placebo
   B. Neither the study group nor the control group knows the identity of the observers

C. Neither observer nor subjects know which subjects receives the vaccine and which receives the placebo
D. Neither observer nor subjects know the nature of the placebo
E. The control group does not know the identity of the study group

15. A case-control study is characterized by all EXCEPT the following:
A. Assessment of past exposure may be biased
B. One selects controls without the disease
C. It is relatively inexpensive
D. Incidence rates may be computed
E. Odds ratio may be estimated from the results

16. Select the correct statement:
A. The attributable risk is a ratio of the disease risk in the exposed compared to the non-exposed during a defined period of time
B. The attributable risk is the excess risk of disease in the exposed compared to the non-exposed during a defined period of time
C. The attributable risk is the disease risk in a defined group at a specific point in time
D. The attributable risk is the prevalence of disease in the exposed minus the prevalence of disease in the non-exposed

17. Which of the following is the weakest of the causal criteria?
A. Analogy
B. Strength of association
C. Dose-response
D. Temporality
E. Biological plausibility

18. Which of the following terms best describes a factor that must be present for an outcome to occur?
A. Necessary
B. Sufficient
C. Both necessary and sufficient
D. A confounder

19. To reduce the consequences of disease by early detection and treatment is which type of prevention?
A. Primary
B. Secondary
C. Tertiary
D. Primordial prevention

20. The following is an example of a live attenuated vaccine:
A. BCG
B. Tetanus toxoid
C. Pertussis
D. Hepatitis B

21. The fraction shown below is a :
    A. Proportional mortality ratio
    B. AIDS cause–specific rate
    C. Case fatality rate
    D. Mortality rate

$$\left(\frac{\#\ men\ who\ died\ of\ AIDS\ in\ Kisumu\ in\ 2012}{\#men\ who\ died\ in\ Kisumu\ in\ 2012}\right) X100$$

22. Which of the following best defines "reliability" of a screening test?
    A. How much disease the screening test can detect in the screening process
    B. A reflection of the repeatability of the screening test
    C. How well the screening actually measures what it is supposed to measure
    D. A reflection of the sensitivity and specificity of the screening test

23. Pathogenicity is:
    A. The ability of a disease agent to produce toxins or poison
    B. The ability of a disease agent to produce clinically apparent illness in an infected host
    C. The ability of a disease agent to induce antibody production in the host
    D. The ability of a disease agent to invade and multiply in a susceptible host
    E. The ability of a disease agent to produce severe clinical manifestation of disease in a host

24. Which of the following factors is UNLIKELY to increase the prevalence of a certain disease:
    A. Improved diagnostic facilities
    B. Improved cure of cases
    C. An increased survival with disease
    D. An increased in-migration of disease cases

25. In which study design is random assignment useful for controlling confounding?
    A. Case-control
    B. Cohort
    C. Experimental
    D. Cross-sectional

SECTION B: SHORT ANSWER QUESTIONS (30 marks)

USE a separate sheet of paper. ANSWER ALL QUESTIONS IN THIS SECTION

1. Define the following terms:
    (a) Incubation period [2 marks]
    (b) Randomization [2 marks]
    (c) Cumulative incidence [2 marks]
    (d) Positive predictive value [2 marks]
    (e) Prevalence [2 marks]

2. Specify the key features of the following study designs:
   (a) Clinical trial [2 marks]
   (b) Case-control study [2 marks]
   (c) Cohort study [2 marks]
   (d) Ecological study [2 marks]

3. List 3 differences between :
   (a) an experimental study and a cohort study [4 marks]
   (b) cumulative incidence and incidence rate [4 marks]
   (c) Dynamic and closed cohorts [4 marks]

SECTION C SHORT ANSWER QUESTIONS (45 marks)

USE a separate sheet of paper. ANSWER ANY <u>TWO</u> QUESTIONS INCLUDING QUESTION 1. QUESTION 1 is compulsory for ALL candidates (30marks). Choose ANY OTHER Questions from Questions 2 OR 3 (15 marks each)

1. A case-control study of the association between coffee drinking and pancreatic cancer gave the following results:

	Non-coffee users	**Coffee drinkers (exposed)**

	(unexposed)	No. of cups drank/day		
		1-2	**3-4**	**>5**
Cases	20	153	106	93
Controls	88	271	154	130

(a) Calculate the odds ratio of pancreatic cancer , with non-coffee users as the reference group, for those drinking:

(i) 1-2 cups of coffee per day [3 marks]

(ii) 3-4 cups of coffee per day [3 marks]

(iii) more than 5 cups of coffee per day [3 marks]

(b) From your answers to (a) what is the trend? [2 marks]

(c) Set up a 2X2 table and re-calculate the odds ratio of coffee drinking on pancreatic cancer without considering the number of coffee cups drank per day [5 marks]

(d) State the meaning of your answer in (c) in your own words. [2 marks]

(e) Discuss how confounding could be minimized in this study? [4 marks]

(f) List two differences between this design and a retrospective cohort design? [4 marks]

(g) List two situations when this study design can be used [4 marks]

Choose any ONE Question from Questions 2 OR 3 (15 marks each)

2. An epidemiological study was conducted among men in Kenya to find out whether the use of hormones by their mothers during pregnancy influenced the son's risk of developing prostate cancer later in life. The investigators selected 500 men who were hospitalized for prostate cancer (cases) and 1000 control men. The study found that 90 mothers of the cases and 50 mothers of the controls had used hormones during pregnancy.
   (a) What study design was used in this study? [2 marks]
   (b) Set up the 2X2 table for this data [2 marks]
   (c) Calculate the odds ratio [4 marks].
   (d) State in your own words your interpretation of the odds ratio [1 mark].
   (e) List 3 advantages and 3 limitations of a case-control study [6 marks]

3. A study was conducted among patients visiting at Kericho District Hospital for evaluation of possible malaria. They were all screened by a blood smear for malaria. Out of 595 patients who were febrile 75 tested positive for malaria, compared with 16 out of 712 patients who were not febrile.
   (a) Construct a 2X2 table for this data [2 marks].
   (b) Calculate the:
      (i) prevalence of malaria [1.5 marks]
      (ii) sensitivity of a blood slide [1.5 marks];
      (iii) specificity of a blood slide [1.5 marks];
      (iv) positive predictive value of a blood slide [2 marks], and
      (v) negative predictive value for a malaria blood slide [2 marks].
   (c) List any 3 considerations needed for setting up a screening programme [4.5 marks]