Uganda Martyrs University, Faculty of Health Sciences
Bachelor of Science–Public Health and Health Promotion
Basic Epidemiology and Biostatistics 2
End of Semester Examination
SAT 27/7/19
9:00 AM-12:00NOON

<u>Instructions</u>
i.   *This paper is composed of Sections A and B*
ii. *Attempt all questions*
iii. *Time allowed: 3hours*

iv. *No conversations during Examination*
v.   *Answers should be written in the sheets provided*

<u>Section A</u>

1. _____ includes searching for cases and inquiring directly with individuals for signs and symptoms in epidemics or in a situation where an epidemic is anticipated.
   A. Passive Surveillance
   B. Active Surveillance
   C. Person to Person Surveillance
   D. Individual Surveillance

2. The occurrence in a community or region of cases of an illness, specified health behavior, or other health related events clearly in the excess of normal expectancy; the community or region, and the time period in which cases occur, are specified precisely.
   A. Endemic
   B. Epidemic
   C. Pandemic
   D. Transdemic

3. Epidemiologists define disease occurrence in terms of:
   A. Agent
   B. Host
   C. Environment
   D. All of the above
   E. A and B

4. ___is an epidemic where the incidence of disease extends to a whole country or large partof the world.
   A. Epidemic
   B. Pandemic
   C. Endemic
   D. Hyper Epidemic

5. ____ disease is a disease that is prevalent in a population in a certain area for a long period of time
   A. Endemic
   B. Epidemic
   C. Pandemic
   D. None of the above

6. _____are actionstaken to promote one's health that prevent disease and disability in an individual.
   A. Primary Prevention
   B. Tertiary Prevention
   C. Secondary Prevention
   D. None of the above

7. _____refers to actions leading to the early identification, diagnosis, and treatment of a disease to limit the consequences of such exposure and to interfere with disease transmission.
    A. Primary Prevention   C. Secondary Prevention
    B. Tertiary Prevention   D. None of the above

8. What shape is a normal distribution?
    A. Descending line   C. Bell shaped
    B. Ascending line   D. Flat

9. The mean is 12 and number of observations are 20 then sum of all values is:
    A. 8   C. 240
    B. 32   D. 1.667

10. The range of a sample gives an indication of the
    A. way in which the values cluster about a particular point
    B. number of observations bearing the same value
    C. maximum variation in the sample
    D. degree to which the mean value differs from its expected value

11. What is the median of the sample 5, 5, 11, 9, 8, 5, 8?
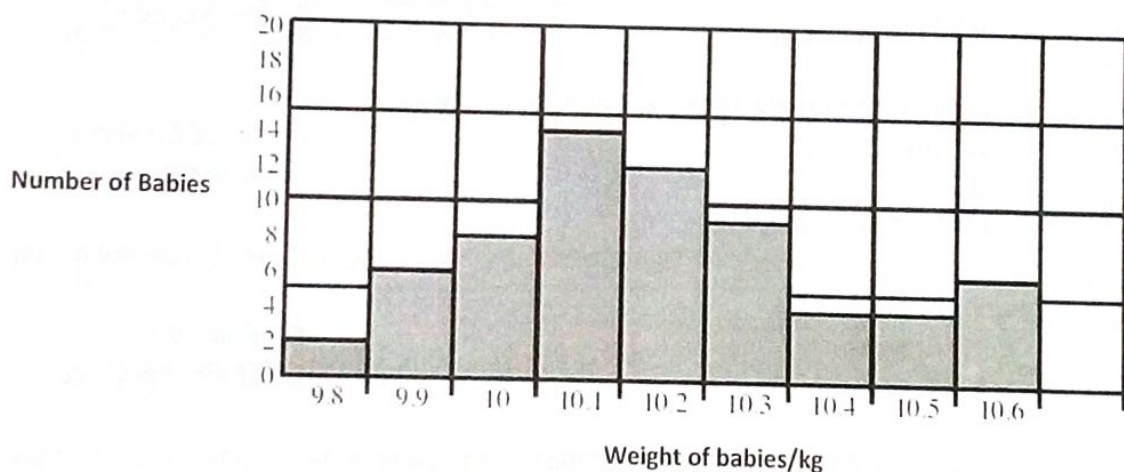   A. 5   B. 6   C. 8   D. 9

For numbers 12 - 13 refer to the information below.
The following scores were obtained by weighing 11 children during an immunization day:
    5 3, 6, 8, 7, 8, 3, 11, 6, 3, 2.
12. The modal weight was: A.3   B.6   C.8   D.11

13. The median weight was: A.3   B.6   C.8   D.11

For numbers 14–16 refer to the graph below.
Number of babies for immunization having a certain weight

Weight of babies/kg

14. How many babies were weighed?   A. 9 B.14 C. 65   D. 92

15. What is the frequency of the median weight?   A.7 B.8 C.12 D.14

16. What is the modal weight?   A. 9.9 kg B. 10.1 kg   C. 10.2 kg D. 10.5 kg

17. The mean of ten numbers is 58. If one of the numbers is 40, what is the mean of the other nine?
    A. 18   B. 60 C. 162 D. 540

18. The mean of 11 numbers is 7. One of the numbers, 13, is deleted. What is the mean of the remaining 10 numbers? A 7.7 B. 6.4 C. 6.0 D. 5.8

Data for questions 19-22: [14, 10, 9, 11, 17, 20, 7, 90, 13, 9]

19. Using the data shown above, the arithmetic mean is:
   A. 20   B. 20.5   C. 22   D. 19.5

20. Using the data shown above, the median is:
   A. 11   B. 11.5   C. 9.5   D. 12

21. Using the data shown above, the mode(s), if any is.
   A. 14   B. 9   C. 9.5   D. 90

22. Using the data shown above, the range is:
   i. 65   B. 70   C. 83   D. 35

23. In an outbreak of cholera in a village of 2,000 population, 20 cases have occurred and 5 died. Case fatality rate is:
   a. 1%   b. 0.25%   c. 5%   d. 25%

24. This criterion specifies that one must observe the cause before the effect:
   A. Temporality   B. Biological Gradient   C. Plausibility   B. Consistence

25. Obtaining information about exposures that occurred in the past is considered a/an:
   A. Prospective Approach
   B. Retrospective Approach
   C. Ecological Fallacy
   D. Case Control Study

26. The measure of association used in a case-control study is:
   A. Ecologic Correlation   B. Odds Ratio   C. Relative Risk   D. Incidence Rate

27. For cumulative incidence to be accurate, the following conditions should be met:
   A. Fixed population
   B. Entire population is followed for the entire follow-up period
   C. All first events are detected
   D. All the above

28. In an outbreak of salmonella food poisoning, 27 of the 135 people who ate the beef stew became ill over a one-week period. What is the attack rate?
   A. 27 over a 1-week period B. 0.20 over a 1-week period C. 2.0 over a 1-week period
      D. 2.7%

29. In an Interview Study of Measles the question"Does your child currently have Measles?" is to assess:
   A. Point prevalence B. Period prevalence   C. Cumulative incidence D. None of these

30. In calculating incidence rate, Person-Time refers to the:
   A. Sum of "disease-free" time for each person B. total loss to follow up
   C. A and B   D. None of these

31. _____data takes on only certain numeric values including decimal points.
   A. Discrete   B. Continuous C. Categorical   D. Non-random

32. The following is one of the characteristics of quantitative variables
     A. Has values that are intrinsically numerical   B. Has values that are intrinsically non-numerical
     C. All the above
     C. None of the above

33. Interval scale measures:
     A. Equal numerical distances between intervals
     B. Un-equal numerical distances between intervals
     C. Nither of the Above
     D. Both A and B

34. If incidence is high, but duration is short,
     A. Prevalence is relatively high   B. Prevalence is relatively low
     C. Prevalence remains the same   D. Nothing happens

35. Sufficient but not Necessary cause refers to:
     A. A factor by itself is neither sufficient nor necessary
     B. The factor alone can produce disease but other factors cannot
     C. The factor alone can produce disease but so can other factors acting alone
     D. The factor alone cannot produce disease

36. Studying the frequency of health events falls under_____ epidemiology:
     A. Applied and analytic   B. Analytic   C. Applied   D. Descriptive

37. In causation, dose-response relationship means that:
     A. As the level of exposure is increases, the rate of disease reduces
     B. As the level of exposure is increases, the rate of disease also increases
     C. As the level of disease increases the exposure reduces
     D. As the rate of disease reduces, the level of exposure is constant

38. The sample variance (s) of a population sample is 370.612. What is the standard deviation?
     A. 91   B. 18.9   C. 19.25   D. 21.5

39. Randomised, controlled trials provide strong evidence that an observed effect is due to the intervention (the assigned exposure). One reason is because:
     A. when the participants are randomised, many characteristics and possible confounding factors are likely to be evenly distributed in the groups
     B. it is easier to measure the outcome variable with great precision in randomised, controlled trials compared to in other study designs
     C. the exposure level and the outcome are measured at the same time
     D. the study participants are volunteers and therefore motivated to take part in the study

40. In case series, we assess the:
     A. experience of a specific case of a condition
     B. experience of a group of patients with different diagnosis
     C. experience of a group of patients with a similar diagnosis
     D. All the above

41. Odds ratio refer to:
     A. The ratio of the probability that an event will occur to that that the event will not occur
     B. The probability that an event will occur
     C. The probability that an event will not occur

D. The probability that an event will occur minus the probability that an event will not occur

42. Population at risk considered in calculating cumulative incidence must:
    A. be susceptible   B. be free of disease   C. have relevant organs   D. All the above

43. A study starts with 5,000 people. Of these, 125 have the disease in question. What is the prevalence of disease per 1000 people?
    A. 2.5   B. 250   C. 2.51   D. 25

44. The cross-sectional epidemiologic study is not suitable to demonstrate the causal relationship because:
    A. it cannot ascertain time temporality of the cause and effects
    B. it is not able to give statistically significant results
    C. the study population cannot be stratified according to variables of interest; therefore, the study is not able to test the associations between the causes and effects

45. Which of the following epidemiologic designs is particularly suitable to study rare diseases:
    A. the case-control study
    B. the cohort studies
    C. the intervention studies
    D. all above stated epidemiologic designs are equivalent

46. The case-control study is not the suitable design for studying of:
    A. the diseases with a long latency period
    B. the rare diseases
    C. the chronic diseases
    D. the rare exposures (risk factors)

47. The strength of association in the case-control study is described by:
    A. the relative risk (RR)
    B. the attributable risk (AR)
    C. the odds ratio (OR)
    D. the reduction in relative risk (RRR)

48. The OR (odds ratio) of 1 indicates:
    A. no association has been found
    B. the association is rather weak
    C. the relationship between the exposure and disease incidence is linear
    D. the result did not reach the level of statistical significance

49. The analysis of descriptive epidemiologic studies enables:
    A. to compare data obtained from basic and control groups
    B. to generate causal hypotheses
    C. to test statistical significance of data
    D. to confirm the hypotheses on an association

50. Of the variables listed below, which would you use a nominal scale for?
    A. Antibody titers against influenza A/H1N1   C. Height in centimetres
    B. Sex   D. Parity

51. Frequency distributions are appropriate for:
    A. nominal scale variables only
    B. ordinal scale variables only

C. both nominal scale and ordinal scale variables
D. neither nominal scale nor ordinal scale variables

Fraction for question 6:

$$\frac{\text{\#women in the Uganda who died from cancer in 1991}}{\text{\#women in the Uganda who died from heart disease in 1991}}$$

52. The fraction shown above is a: (Circle ALL that apply.)
    A. ratio
    B. proportion
    C. attack rate
    D. mortality rate

53. During the second week of February, 87 persons in a small community (population 460) attended a social event which included a meal prepared by several of the participants. Within 3 days, 39 of the participants became ill with a condition diagnosed as salmonellosis. The attack rate among participants was:
    A. 0.45/100
    B. 8.5/100
    C. 18.9/100
    D. 44.8/100
    E. cannot be calculated from the information given

54. In an outbreak of hepatitis B, 6 persons became ill with clinical symptoms 24 to 31 days after exposure. The incubation periods for the affected persons were 29, 31, 24, 29, 30, and 25 days. Calculate the mean incubation period for the hepatitis outbreak.
    A. 22   B. 23 days   C. 28 days   D. 25 days

55. A questionnaire was administered to the persons who attended a rolex festival. The two-by-two table shown below summarizes the relationship between consumption of rolex and illness.

	Ill	Well	Total
Exposed	36	12	48
Unexposed	03	36	39
	39	48	87

The best estimate of the relative risk is approximately:
    A. 1.7   B. 3.7   C. 9.7   D. 36.0

56. The following are examples of Hills Criteria for causation except:
    A. Strength of association
    B. Temporality
    C. Probability
    D. Specificity

57. A necessary cause is a factor that:
    A. must be present for disease to occur
    B. Without the factor the disease never develops, with the factor the disease always develops
    C. is both necessary and sufficient
    D. None of the above

58. In a criminal trial, a Type II error is made when:
    A. a guilty defendant is acquitted (set free)
    B. an innocent person is convicted (sent to jail)
    C. a guilty defendant is convicted
    D. an innocent person is acquitted
    E. no decision is made about whether to acquit or convict the defendant

59. A Type I error occurs when we:
    B. reject a false null hypothesis
    C. reject a true null hypothesis
    D. do not reject a false null hypothesis
    E. do not reject a true null hypothesis
    F. fail to make a decision regarding whether to reject a hypothesis or not

60. The standard error of the meanrepresents:
    A. the difference between the sample mean and the true population mean
    B. the systematic error in measuring the mean
    C. the variability of a set of observations about the mean
    D. the variability of a set of sample means about the true population mean

ANSWER SHEET: SEC A QNS 1-60

1.		14.		27.		40.		53.	
2.		15.		28.		41.		54.	
3.		16.		29.		42.		55.	
4.		17.		30.		43.		56.	
5.		18.		31.		44.		57.	
6.		19.		32.		45.		58.	
7.		20.		33.		46.		59.	
8.		21.		34.		47.		60.	
9.		22.		35.		48.			
10.		23.		36.		49.			
11.		24.		37.		50.			
12.		25.		38.		51.			
13.		26.		39.		52.			

SECTION B: SHORT ANSWER QUESTIONS (20 MARKS)

Attempt all the questions.

1. We wish to estimate the proportion of Kampala males who smoke. What sample size do we require to achieve a 95% confidence interval of width ± 5% (that is to be within 5% of the true value)? In a study of 2years ago that found approximately 30% were smokers. Note: the formula for sample size for a single proportion: $n = [Z^2_{(1-\alpha)} p(1-p)]/d^2$ (5marks).

_____

_____

_____

_____

_____

_____

2. The following table represents the distribution respondent by their age in a research

Age (X)	Frequency, f	fX	Mean ($\bar{X}$)	$(X - \bar{X})^2$
29.5	1	....	....	
39.5	1	....	....	
49.5	3	....	....	
59.5	13	....	....	
69.5	45	....	....	
79.5	36	....	....	
Total	....	....	....	

conducted one of the zones in Rubaga division. Use it to answer the questions below.

i)   Complete the frequency table below (8marks)
ii)   Calculate the sample mean (3 marks)

_____

_____

_____

_____

iii) Calculate the standard deviation (4marks).

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END!