AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF MEDICAL SCIENCES
DEPARTMENT OF NURSING & MIDWIFERY SCIENCES
BACHELOR OF SCIENCE IN NURSING
END OF SEPTEMBER-DECEMBER TRIMESTER 2022 EXAMINATIONS

BSN 315 :BIOSTATISTICS

DATE: 30TH NOVEMBER 2022

Duration: 2 HOURS   Start: 2:00PM   Finish: 4:00 PM

INSTRUCTIONS
1. This exam is out of 70 marks
2. This Examination comprises THREE Sections. Section I: Multiple Choice Questions (20 marks) Section II: Short Answer Questions (30 marks) and Section III: Long Answer Questions (20 marks)
3. Answer ALL Questions.
4. Do Not write anything on the question paper -use the back of your booklet for rough work if need be.

SECTION I: MULTIPLE CHOICE QUESTIONS (TOTAL: 20 MARKS)

1. Gender, age-class, religion, type of disease, and blood group are measured on:
   A. Nominal scale of measurement
   B. Ordinal scale of measurement
   C. Interval scale of measurement
   D. Ratio scale of measurement

2. Frequency distribution is characterized by:
   A. The measure of quartile range
   B. The measure of central tendency
   C. The determination of extreme values in a data set
   D. The estimation of percentile

3. The median possesses certain properties, they include the following except
   A. Uniqueness
   B. Simplicity
   C. It is affected by each value
   D. Extreme values have no influence

4. Geometric mean is:
   A. The n observations, then it is the nth root of the product of the n observation
   B. More suitable for values changing literally
   C. Can be used where reciprocal of actual values seem more useful
   D. Much statistical inference is based on this distribution

5. Suppose that the probability of event A is the same regardless of whether or not B occurs, we say that events are
   A. Dependent
   B. Independent
   C. Conditional
   D. Joint

6. Large standard deviations suggest that:
   A. Scores are probably widely scattered.
   B. There is very little deference among scores.
   C. Mean, median and mode are the same
   D. The scores not normally distributed.

7. Type 1 error is:
   A. Accepting null hypothesis while alternative hypothesis is true

B. Accepting null hypothesis while alternative hypothesis is false
C. Rejecting null hypothesis while alternative hypothesis is true
D. Rejecting null hypothesis while alternative hypothesis is false

8. The statistical approach which helps the investigator to decide whether the outcome of the study is a result of factors planned within design of the study or determined by chance is called:
   A. Descriptive statistics
   B. Inferential statistics
   C. Normal distribution
   D. Standard deviation

9. One sample *t* test is used to determine whether
   A. the mean of a sample is different from the expected value
   B. the mean of two independent sets of measurement are different
   C. there is difference between two sets of paired observations
   D. the mean of the sample is similar to the mean of the population

10. Variables whose values can be expressed numerically are called
    A. Quantitative variable
    B. Qualitative variables
    C. Absolute variables
    D. Continuous variables

11. The mean of a sample is
    A. always equal to the mean of the population
    B. always smaller than the mean of the population
    C. computed by summing the data values and dividing the sum by (n - 1)
    D. computed by summing all the data values and dividing the sum by the number of items

12. If a data set has an even number of observations, the median
    A. cannot be determined
    B. is the average value of the two middle items
    C. must be equal to the mean
    D. is the average value of the two middle items when all items are arranged in ascending order

13. A tabular summary of a set of data showing the fraction of the total number of items in several classes is a
    A. frequency distribution
    B. relative frequency distribution
    C. frequency
    D. cumulative frequency distribution

14. The standard deviation of a sample of 100 observations equals 64. The variance of the sample equals

    A. 8
    B. 10
    C. 6,400
    D. 4,096

15. A type of graph which displays the median value by a horizontal bar surrounded by 50% of scores shown within a box is a:
    A. Histogram
    B. Box plots
    C. Frequency polygon
    D. Normal distribution

16. Nonparametric test include
    A. Regression
    B. Correlation
    C. Friedman test
    D. Analysis of variance

17. The table below shows decision made based on hypothesis test, match letters with errors that may occur due to decision made based on the hypothesis.

Truth	Decision	
	True	False
True	W	X
False	Y	Z

    A. X – Type II error, Y – Type I error
    B. X – Type I error, Y – Type II error
    C. W – Type II error, Z – Type I error
    D. W – Type I error, Z – Type II error

18. One-sample sign test is appropriate for testing whether:
    A. Sample median of one measurement taken on a single population is different from the expected value
    B. Sample mean of one measurement taken on a single population is different from the expected value
    C. Sample mode of one measurement taken on a single population is different from the expected value
    D. Median of two sample measurements made on identified population are different from each other

19. The relationship between sample size and mean is best described by:
    A. The smaller the population size, the smaller the relationship will be between sample mean and population mean
    B. The larger the sample size, the closer the sample mean will be to population mean
    C. The smaller the sample size, the closer the sample mean will be the population mean
    D. The larger the population size, the closer the population mean will be to the sample mean.

20. Under what circumstances should we be cautious about using the mean as a measure of central tendency
    A. When data is negatively skewed
    B. When data is skewed
    C. When data is positively skewed
    D. All of the above

SECTION II: SHORT ANSWER QUESTIONS (TOTAL: 30 MARKS)

1. Define the following terms
    Platykurtic.   (1 marks)
    Leptokurtic.   (1 marks)
    Interquartile range   (1 marks)
    Coefficient variation   (1 marks)

2. State four measurements of scale in biostatistics   (4 marks).

3. State the properties of mean   (4 marks).

4. List requirements a table used in frequency distribution must satisfy   (2 marks)

5. State four characteristics of a frequency distribution   (4 marks)

6. Explain two types of research procedures with reference to hypothesis testing   (4 marks)

7. State four types of problems addressed by inferential statistics   (4 marks)

8. Explain two laws of probability for independent events   (4 marks).

SECTION III: LONG ANSWER QUESTION (TOTAL: 20 MARKS)

1. In an otological examination of school children, out of 146 children examined, 21 were found to have some type of otological abnormalities.
    a) Formulate null hypothesis   (2 marks).
    b) Calculate standard error of proportion   (4 marks).
    c) Calculate critical ration   (5 marks).
    d) Compare with the theoretical value of 95% Confidence interval which is 1.96 at 5% level (6 marks).
    e) Do inference of the results   (3 marks).