AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF MEDICAL SCIENCES
DEPARTMENT OF NURSING & MIDWIFERY SCIENCES
END OF SEMESTER AUGUST 2024 EXAMINATIONS

COURSE CODE AND TITLE: BSN 315 BIOSTATISTICS

DATE: Tuesday 6th August 2024

Duration: 2 HOURS Start: 9:00 AM Finish: 11:00 AM

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. Random sampling or probability sampling includes all the following techniques, except:
   A. Simple random sampling
   B. Stratified random Sampling
   C. Cluster sampling
   D. Purposive Sampling

3. The following is true about type II error?
   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

4. 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.

5. The standard deviation of a sampling distribution is referred to as the:
   A. Test statistic
   B. Standard error
   C. Confidence interval
   D. Test of significance

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

13. A statistic which describes the interval of scores bounded by the 25th and 75th percentile ranks is:
   A. Inter quartile range
   B. Confidence Interval
   C. Standard deviation
   D. Variance

14. The formula given below is computational formula for:

$$\sqrt{\frac{\Sigma[X - \bar{X}]^2}{(n-1)}}$$

A. Variance
B. Mean
C. Standard deviation
D. t-statistic

15. 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

16. 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.

17. 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

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 leptokurtic
    B. When data is skewed
    C. When data is platykurtic
    D. When data is mesokurtic

SECTION II: SHORT ANSWER QUESTIONS (30 marks)

1. Explain three probability sampling methods used in research (6 marks).
2. Distinguish between Skewness and Kurtosis of data distribution (4 marks)
3. State five advantages of non-parametric tests (5 marks)
4. Outline six assumptions that need to be met before performing a Between Groups ANOVA (6 marks)
5. From past experience with illnesses of his patients, a doctor has gathered the following information in a population:

   6% feel that they have cancer and do have cancer

   42% feel that they have cancer and don't have cancer

   20% do not feel that they have cancer and do have it

   38% feel that they do not have cancer and really do not have it

   i. Calculate the probability that a patient has cancer, given that he feels he has it (2 marks).

   ii. Calculate the probability he feels he has cancer, given that he does have it is given (2 marks).

6. A health status survey in a few villages revealed that the normal serum protein value of children in that locality is 7.0 g/100 ml. A group of 16 children who received high protein food for a period of six months had serum protein value as shown in the table below:

   a) Calculate standard error for the mean (2 marks).

   b) Calculate critical ratio (2 marks)

   c) Interpret the results (1 mark)

SECTION III: LONG ANSWER QUESTION (20 marks)

1. A sample of 6 children was selected, data about their age in years and weight in kilograms was recorded as shown in the following table. It is required to find the correlation between age and weight.

Serial No	**Age (years)**	**Weight (Kg)**

1	**7**	**12**
2	**6**	**8**
3	**8**	**12**
4	**5**	**10**
5	**6**	**11**
6	**9**	**13**

a) Calculate correlation coefficient between age and weight (8 marks)

b) Interpret the correlation result (2 marks)

c) Find the regression equation (8 marks).

d) What is the predicted weight when age is 8.5 years (2 marks).