

Reg No.



**AMREF INTERNATIONAL UNIVERSITY  
SCHOOL OF MEDICAL SCIENCES  
DEPARTMENT OF NURSING & MIDWIFERY SCIENCES  
END OF SEMESTER APRIL 2024 SUPPLEMENTARY EXAMINATIONS**

**BSN 315 BIOSTATISTICS**

**DATE: 20<sup>TH</sup> MARCH 2024**

Duration: 2 HOURS

Start: 8:00 AM

Finish: 10:00 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 A: 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. Which of the following is not a measure of central tendency of a data set
  - A. Population mean
  - B. Statistics Median
  - C. Standard deviation
  - D. Modal value
3. The arithmetic mean possess certain properties, they include the following except
  - A. Uniqueness
  - B. Simplicity

- C. It is affected by each value
  - D. Specificity
4. 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
5. The following are true about probability of complementary events except
- A. The probability of an event is equal to 1 minus the probability of its complement
  - B. It follows the third property of probability
  - C. The event and its complement are mutually exclusive.
  - D. The probability one event is dependent on the other
6. Which of 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
7. 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.
8. Which is NOT a characteristic of normal distribution?
- A. Symmetric
  - B. Bell-shaped
  - C. Mean = median = mode
  - D. Negative skewness
9. Which of the following statements about power of a test is *FALSE*?
- A. Power of the test refers to probability of detecting a predefined clinically significant difference.
  - B. Power of a test explains the risk of a false-positive finding
  - C. Power of the test is usually set at (1-20%) 80%
  - D. Power =  $1 - \beta$
10. What is *TRUE* about research hypothesis?
- A. States there is no relationship between the variables.
  - B. Statement about the expected relationship of the variables
  - C. States a negative relationship between the variables

D. Research hypothesis should always be directional.

11. 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

12. 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

pyright

14. The formula given below is computational formula for:

$$\sqrt{\frac{\sum(X - \bar{X})^2}{(n - 1)}}$$

- A. Variance
- B. Mean Copyright @ <http://nursingplanet.com/Quiz>
- C. Standard deviation
- D. t-statistic

13. Which of the following is not true about statistical inference

- A. It is the procedure by which we reach a conclusion about a population
- B. It is based on the information contained in a sample that has been drawn from that population.
- C. A scientific sample from the population is needed to make it
- D. You can use purposive sampling to generate sample

Match the following words

- |                 |   |
|-----------------|---|
| 14. Sensitivity | A. The probability that a person does not have the disease given that the test was negative |
| 15. Specificity | B. The probability that a person has the disease given that the test was positive           |

16. Positive predictive value      C. The probability that the test is positive given that the person has the disease.
17. Negative predictive value      D. The probability that the test was negative given that the person does not have the disease
18. 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
19. Which of the following is true about skewness of data
- A. Distribution is symmetric  
B. When the left half and right half of the graph of a distribution are not mirror images of each other  
C. The mean, mode and median are at the same point.  
D. The mean and mode differ with median
20. 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

**SECTION B: Answer ALL the questions in this section (30 marks)**

- a) Differentiate the following terms (4 marks).
- Null hypothesis and alternative hypothesis
  - Type I error and Type II error

- b) Consider an experiment in which dissolution data have been collected on a particular formulation, yielding the following figures: 87, 109, 79, 80, 96, 95, 90, 92, 96, 98, 101, 91, 78, 112, 94, 98, 94, 107, 81, 96
- Construct a stem and leaf display for this data (3 marks).
  - Comment on the shape of the stem and leaf (2 marks).
- c) In the health survey of schoolchildren, it is found that the mean Hb level of 55 boys is 10.2 per 100 ml with a standard deviation of 2.1. We can consider this group as taken from a population with a mean 11.0 g/100 ml?
- State null hypothesis (1 mark)
  - Calculate the Standard error of the mean (4 marks)
  - Critical ratio (3 marks)
- d) State four properties of the mean (4 marks).
- e) You believe that people who die from overdoses of narcotics die rather young. To test this theory, you have obtained the following distribution of a number of deaths from overdoses:

Age interval	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Number of deaths	40	35	32	10	13	13	4

- Calculate the Chi-square statistics (6 marks)
- Interpret the results (3 marks)  
Given that Degree of freedom is  $7-1 = 6$ ; the Chi-square value at a significance of 0.05 and df of 6 is 12.592

**SECTION C: Answer ALL the questions in this section (20 marks)**

Data by Mazze et al. [1971] deal with the preoperative and postoperative creatinine-clearance (ml/min) of six patients anesthetized by halothane:

	Patient					
	1	2	3	4	5	6
Preoperative	110	101	61	73	143	118
Postoperative	149	105	162	93	143	100

- Calculate the paired t-test (10 marks)
- Test the significance of the difference (8 marks).
- Interpret the results (2 marks)

ANNUNU