



**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR**

THIRD YEAR FIRST TRIMESTER EXAMINATIONS

**FOR THE DEGREE
OF
BSc MEDICAL LABORATORY SCIENCES**

COURSE CODE: BML 317

MAIN EXAM

COURSE TITLE: MEDICAL BIOSTATISTICS

DATE: 9th December 2020

TIME: 2.00 -5.00 PM

INSTRUCTIONS TO CANDIDATES

This paper is divided into three sections, **A B** and **C**, carrying respectively: Multiple Choice questions (**MCQs**), short answer questions (**SAQs**) and long answer questions.

(**LAQs**)

TIME: 2 Hours

MMUST observes **ZERO** tolerance to examination cheating

This Paper Consists of 5 Printed Pages. Please Turn Over.

SECTION A: MULTIPLE CHOICE QUESTIONS (MCQs)

1. The mean of a distribution is 14 and the standard deviation is 5. What is the value of the coefficient of variation?
A 60.4%
B 48.3%
C 35.7%
D 27.8%
2. The mean of a distribution is 23, the median is 24, and the mode is 25.5. It is most likely that this distribution is:
A Positively Skewed
B Symmetrical
C Asymptotic
D Negatively Skewed
3. Which of the following describe the middle part of a group of numbers?
A Measure of Variability
B Measure of Central Tendency
C Measure of Association
D Measure of Shape
4. According to the empirical rule, approximately what percent of the data should lie within $\mu \pm 2\sigma$?
A 75%
B 68%
C 99.7%
D 95%
5. The sum of the deviations about the mean is always:
A Range
B Zero
C Total Standard Deviation
D Positive
6. The middle value of an ordered array of numbers is the
A Mode
B Mean
C Median
D MidPoint
7. Sum of dots when two dice are rolled is
A a discrete variable
B a continuous variable
C a constant
D a qualitative variable
8. Which of these represent qualitative data

- A Height of a student
 - B Liking or disliking of (500) persons of a product
 - C Income of a government servant in a city
 - D Yield from a wheat plot
9. The first hand and unorganized form of data is called
- A Secondary data
 - B Organized data
 - C Primary data
 - D None of these
10. Which branch of statistics deals with the techniques that are used to organize, summarize, and present the data:
- A Advanced Statistics
 - B Probability Statistics
 - C Inferential Statistics
 - D Descriptive Statistics
11. Statistic is a numerical quantity, which is calculated from:
- A Population
 - B Sample
 - C Data
 - D Observations
12. A quantity obtained by applying certain rule or formula is known as
- A) Sample
 - B) Test Statistics
 - C) Estimate
 - D) Estimator
13. Criteria to check a point estimator to be good are
- A) Consistency
 - B) Unbiasedness
 - C) Efficiency
 - D) All Above
14. $1-\alpha$ is the probability of
- A) Type-I Error
 - B) Rejection Region
 - C) Acceptance Region
 - D) Type-II Error
15. Parameter is a _____ quantity
- A) Constant
 - B) Variable
 - C) Sample
 - D) None of the above
16. Consistency of an estimator can be checked by comparing
- A) Mean
 - B) Mean Square
 - C) Variance
 - D) Standard Deviation
17. If we reject the null hypothesis, we might be making
- A) Type-I Error
 - B) Type-II Error
 - C) A correct Decision
 - D) Unpredictable

18. Herbicide A has been used for years in order to kill a particular type of weed. An experiment is to be conducted in order to see whether a new herbicide, Herbicide B, is more effective than Herbicide A. Herbicide A will continue to be used unless there is sufficient evidence that Herbicide B is more effective. The alternative hypothesis in this problem is
- Herbicide A is more effective than Herbicide B
 - Herbicide B is more effective than Herbicide A
 - Herbicide A is not more effective than Herbicide B
 - Herbicide B is not more effective than Herbicide A
19. Analysis of Variance (ANOVA) is a test for equality of
- Variances
 - Means
 - Proportions
 - Only two Parameters
20. For t distribution, increasing the sample size, the effect will be on
- Degrees of Freedom
 - The t -ratio
 - Standard Error of the Means
 - All Above

SECTION B: SHORT ANSWER QUESTIONS (40 Marks)

- Write short notes on the following:
 - Variables. [8 marks]
 - Non-parametric tests. [8 marks]
 - Parametric tests. [8 marks]
 - Biostatistics [8 marks]
- Briefly describe any four scales of measurements. [8 marks]
- Briefly describe the steps involved in hypothesis testing. [8 marks]
- Describe any four types of parametric tests. [8 marks]
- Distinguish between the following terms: [8 marks]
 - Test statistic and sample statistic.
 - Categorical and numerical variable.
 - Parameter and statistic
 - Discrete and continuous variable

SECTION C: LONG ANSWER QUESTIONS (40 Marks)

- A major food manufacturer is concerned that the sales for its skinny French fries have been decreasing. As a part of a feasibility study, the company conducts research into the types of fries sold across the country to determine if the type of fries sold is independent of the area of the country. The results of the study are below. Conduct a test for independence. [20 Marks]

Type and Quantity of Fries Ordered Regionally

Type of Fries	Northeast	South	Central	West
skinny fries	70	50	20	25
curly fries	100	60	15	30
steak fries	20	40	10	10

- Suppose the National Transportation Safety Board (NTSB) wants to examine the safety of compact cars, midsize cars, and full-size cars. It collects a sample of three for each of the treatments (cars types). Using the hypothetical data provided below, test whether the mean pressure applied to the driver's head during a crash test is equal for each types of car. Use $\alpha = 5\%$.: Hint $F_{2,6} = 5.14$

[20 Marks]

	Compact cars	Midsize cars	Full-size cars
	643	469	484
	655	427	456
	702	525	402
\bar{X}	666.67	473.67	447.33
S	31.18	49.17	41.68