



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

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

2020/2021 ACADEMIC YEAR

Third YEAR, FIRST TRIMESTER EXAMINATIONS

FOR THE DEGREE

OF

**MASTERS OF SCIENCE IN HEALTH PROFESSIONS
EDUCATION**

COURSE CODE: HPE 813

COURSE TITLE: Medical Biostatistics and computing

DATE: Wednesday 27th January 2021 TIME 8:00-11:00AM

INSTRUCTIONS TO CANDIDATES

Answer all Questions

Sec A: Multiple Choice Questions (MCQ) 20 Marks

Sec B: Short Answer Questions (SAQ) (40 marks)

Sec C: Long Answer Questions (LAQ) (40 marks)

TIME: 3 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 4 Printed Pages. Please Turn Over.

SECTION A-MCOS (20 MARKS)

1. Range or set of values which have chances to contain value of population parameter with particular confidence level is considered as

- a) Secondary interval estimation
- b) Confidence interval estimate
- c) Population interval estimate
- d) Sample interval estimate

2. Upper and lower boundaries of interval of confidence are classified as

- a) Error biased limits
- b) Marginal limits
- c) Estimate limits
- d) Confidence limits

3. Test of hypothesis $H_0: \mu = 50$ against $H_1: \mu > 50$ leads to:

- a) Left-tailed test
- b) Right-tailed test
- c) Two-tailed test
- d) Difficult to tell

4. The probability of rejecting the null hypothesis when it is true is called:

- a) Level of confidence
- b) Level of significance
- c) Power of the test
- d) Difficult to tell

5. In special rule of addition of probability, the events are always

- a) Independent events
- b) Mutually Exclusive events
- c) Bayesian
- d) Empirical

6. Which of the following is not a condition of the binomial distribution?

- a) Only 2 possible outcomes
- b) Have constant probability of success
- c) Must have at least 3 trials
- d) Trials must be independent

7. In a Poisson probability distribution

- a) The mean and variance of the distribution are same (equal)
- b) The probability of success is always greater than 5
- c) The number of trials is always less than 5
- d) It always contains a contingency table

8. If the occurrence of one event means that another cannot happen, then the events are

- a) Independent
- b) Mutually Exclusive
- c) Bayesian
- d) Empirical

9. In normal distribution, total area under the normal curve is:

- a) Less than 1
- b) 0
- c) Greater than 1
- d) 1

10. When four coins are tossed, the value of a random variable (Number of head) is

- a) 0, 1, 2, 3
- b) 1, 2, 3, 4
- c) 0, 1
- d) 0,1,2,3,4

11. Any numerical value computed from population is called

- a) Statistic
- b) Bias

- c) Sampling error
- d) Parameter

12. Data which is not arranged in ascending or descending order is called?

- a) Raw
- b) Cumulative frequency
- c) Group
- d) Arrangement

13. The smallest and the largest value of any given class of a frequency distribution are called?

- a) Class marks
- b) Class interval
- c) Mid-point
- d) Class limit

14. When constructing a histogram which is to be taken along X-axis?

- a) Class interval
- b) Class frequency
- c) Class boundaries
- d) Class mark

15. The graph obtained by joining the mid points of the tops of adjacent rectangles in histogram is called?

- a) Frequency polygon
- b) Ogive
- c) Pie chart
- d) Histogram.

16. Measures that are used to determine degree or extent of variation in a data set are called

- a) Mean
- b) Median
- c) Measures of dispersion
- d) Measures of central tendency

17. The stages of a malignant disease (cancer) is recorded using symbols 0,1,11,111,1V. This scale of measurement is

- a) Alphanumeric
- b) Numerical
- c) Ordinal
- d) Nominal.

18. Complete correlation between height and weight is best given by:

- a) -1
- b) +1
- c) 0
- d) Infinity

19. The Wilcoxon Rank-Sum test used to compares

- a) Two populations
- b) Three Populations
- c) A sample mean to the population mean
- d) Any number of populations

20. A repeated measures t-test can be used to assess which of the following?

- a) It assesses relationships between two interval data sets.
- b) It assesses goodness of fit
- c) It assesses differences between scores obtained on two separate occasions from the same participants
- d) It assesses differences between two groups of participants

SECTION B –SAQS (40 Marks)

1. A study is conducted concerning the blood pressure of 60-year-old women with glaucoma. In the study 200 60-year old women with glaucoma are randomly selected and the sample mean systolic blood pressure is 140 mm Hg and the sample standard deviation is 25 mm Hg .(10 Marks)

a) Calculate a 95% confidence interval for the true mean systolic blood pressure among the population of 60-year-old women with glaucoma.

b) Suppose the study above was based on 100 women instead of 200 but the sample mean (140) and standard deviation (25) are the same. Recalculate the 95% confidence interval. Does the interval get wider or narrower? Why?

2. a) Differentiate qualitative and quantitative data (2 marks)

b) List four (4) types of non-probability and four (4) probability sampling techniques (8 marks)

3. The pulse rate of 12 individuals were as follows: 72,88,74,78,84,90,80,84,80,86,88,86. Calculate the following (10 Marks)

a) The Mean

b) The variance

c) Q1 and Q3

d) IQR

e) Construct a box plot

SECTION C-LONG ANSWER QUESTIONS (40 Marks)

Attempt only one questions

1. People travelling to areas where malaria is common typically take protective drugs before, during and after their trip. A study was done to determine the preference of the travelers on the type of Malaria drugs they prefer. A sample of 70 travelers were picked using a probability sampling method. 37 females and 33 males. Two types of drugs were offered. Chloroquine and ACT. The results showed that 28 females choose ACT compared to 16 for males
 - a) Construct a table of observed frequency (2 marks)
 - b) Computing the expected frequency (4 marks)
 - c) State its null and alternative hypothesis (4 marks)
 - d) Calculate the degree of freedom (2 Mark)
 - e) Calculate the chi square test at a significance level of $\alpha = 0.05$ (6 marks)
 - f) Interpret the test statistic (2 marks)

2. Covid -19 pandemic has brought about congestion in most of the hospital. This has led the health ministry to select specific hospitals to be isolation centers. Mbagathi Hospital is one of them. Suppose the average number of patients admitted on each day is 6. What is the probability that the hospital will admit: (20 Marks)?
 - a) Fewer than five patients on the next 1-day clinic? (10 Marks)
 - b) At least five patients on the next day 1- day clinic? (8 Marks)
 - c) At most two patients on the next day 1- day clinic? (2 marks)

SUCCESS

