



KENYATTA UNIVERSITY

EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN MEDICAL LABORATORY SCIENCE

HML 413: RESEARCH METHODS AND BIostatISTICS

2ND SEMESTER 2020/2021

TIME: 2 HOURS

INSTRUCTIONS:

Section A: Answer all questions (4 marks each)

1. State the purpose of the following research process
 - (a) Problem statement
 - (b) Literature Review
2. Using an example, explain snowballing sampling technique
3. Explain the difference between the following
 - (i) Type two and Type one error
 - (ii) Dotogram method and Karl Pearson correlation coefficient method
4. Explain 4 roles of statistics in Health
5. If the average of series of values is 20 and their variance is 25. Compute the Coefficient of variation

Section B: Answer only ONE question (20 Mark each)

6. (a) A normal curve has $\mu=20$ and $\sigma=10$. Find the area between $x_1=50$ and $x_2=40$
(8 marks)
(b) For the following data set is/are average distances in meters (M) covered by 12⁴ nursing students who wanted to loose weight,
49,62,11,74,55,80,56,64,34,42,56,67,10 and 46. Compute the following
 - (i) Mean
 - (ii) Median
 - (iii) Variance
 - (iv) Coefficient of VariationRound off you answer to the nearest one decimal place.

(12 marks)

7. (a) A certain human trait is thought to be inherited according to the ratio 1:1:1 homozygous dominant, heterozygous and homozygous recessive. An examination of a simple random sample of 200 individuals yielded the following distribution of the trait: Dominant, 43; heterozygous, 125 and recessive, 32. Using chi-square provide sufficient evidence to cast doubt on the belief about the distribution of the trait.
- Critical value at 95% Confidence level; Degree of freedom 2 is equal to 5.991
- (b) In a certain community, averages of 13 new cases of Breast cancer were diagnosed each year among women aged 18 years. If the annual incidence of Breast cancer follows a Poisson distribution, find the probability that in a given year the number of newly diagnosed cases of breast cancer will be
- (i) Exactly 5 (3 marks)
- (ii) Between 4 and 6 (Inclusive) (7 marks)

Section C: Answer all questions in the answer booklet (½ mark each)

1. A formal document that presents the research objectives, design of achieving these objectives, and the expected outcomes/deliverables of the study is called
- Research design
 - Research proposal
 - Research hypothesis
 - Research report
2. Which statement best describes the purpose of studying research?
- Identifying a problem
 - Developing the research plan
 - Determining a research approach
 - Giving reports
3. An image, perception or concept that is capable of measurement is called
- Scale
 - Hypothesis
 - Type
 - Variable

4. In order to pursue the research, which of the following is priorly required?
 - a. Developing a research design
 - b. Formulating a research question
 - c. Deciding about the data analysis procedure
 - d. Formulating a research hypothesis
5. What is a type 1 error?
 - a. The null hypotheses get accepted even if it is false
 - b. The null hypotheses get rejected even if it is true
 - c. Both the null hypotheses as well as alternative hypotheses are rejected
 - d. The null hypothesis and alternative hypothesis are accepted
6. Which of the following is not a method of Research?
 - a. Survey
 - b. Historical
 - c. Observation
 - d. Philosophica
7. Why do you need to review the existing literature?
 - a. To make sure you have a long list of references
 - b. Because without it, you could never reach the required word-count
 - c. To find out what is already known about your area of interest
 - d. To help in your general studying
8. What are the core elements of a Research Process?
 - a. Introduction; Data Collection; Data Analysis; Conclusions and Recommendations
 - b. Executive Summary; Literature Review; Data Gathered; Conclusions; Bibliography
 - c. Research Plan; Research Data; Analysis; References
 - d. Introduction; Literature Review; Research Methodology; Results; Discussions and Conclusions
9. Which of the following is a non-probability sampling?
 - a. Simple Random Sampling
 - b. Snow balling sampling
 - c. Systematic sampling
 - d. Stratified random sampling

10. Qualitative research includes the following EXCEPT
- a. Designs
 - b. Techniques
 - c. Measures that do not produce discrete numerical data
 - d. Measures that do produce discrete numerical data
11. The term factorial is used to describe:
- a. The product of all the numbers from a particular no. all the way to zero
 - b. The product of all the numbers from a particular number all the way to a thousand
 - c. The product of all the nos. from a particular no. all the way to a million
 - d. The product of all the numbers from a particular no. all the way to one
12. The following are measures of Dispersion Except
- a. Mean
 - b. Standard deviation
 - c. Coefficient of variation
 - d. Variance
13. The following method are used in studying correlation
- a. Spearman's rank and Method of least of squares
 - b. Functional Relationship 1 and Functional relationship 2
 - c. ANOVA and Chi square
 - d. Geometric and T-distribution
14. Binomial distribution was named after
- a. James
 - b. Philip
 - c. Dennis
 - d. Peter
15. If the mean of a series of values is 100 and their variance is 9, then the coefficient of variation is:
- a. 0.03%
 - b. 0.3%
 - c. 30%
 - d. 3%

16. One of the following statements describes the t distribution
- a. Is a test of goodness of fit
 - b. Is a test of independence
 - c. Is a continuous distribution
 - d. Is a discontinuous distribution
17. Nine factorial is equal to
- a. 388,862
 - b. 302,880
 - c. 880,362
 - d. 362,880
18. The correlation coefficient computed for two parameters measured in 429 patients is $r=0.829$.
This means that:
- a. The two parameters are directly correlated, and the link is weak
 - b. The two parameters are inversely correlated, and the link is strong
 - c. The two parameters are directly correlated, and the link is strong
 - d. There are too few cases (under 30) and we do not trust this coefficient's value
19. In statistics, dispersion is described by
- a. Median
 - b. Mode
 - c. Standard deviation
 - d. Mean
20. The following are properties of median EXCEPT
- a. Uniqueness (For a given set of data there is one and only one median).
 - b. Simplicity (It is easy to calculate)
 - c. It is affected by each and every value in a data set
 - d. It is not affected by extreme values as is the mean