



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF HEALTH SCIENCES

**UNIVERSITY EXAMINATION FOR THE DIPLOMA IN
COMMUNITY HEALTH AND DEVELOPMENT**

2nd YEAR 2nd SEMESTER 2023/2024 ACADEMIC YEAR

MAIN CAMPUS

COURSE CODE: HDC 2223

COURSE TITLE: INTRODUCTION TO BIOSTATISTICS

EXAM VENUE:

STREAM: (Dip. Comm. Hlth. Dvpt)

DATE:

EXAM SESSION:

TIME: 2 HOURS

Instructions:

- 1. Answer all the questions in Section A and any 2 questions in Section B.**
- 2. Candidates are advised not to write on the question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

Section A: Answer all the questions in this section [10marks]

1. A measure of central tendency tells us, using a single value, the best representation for an entire set of scores. A measure of variability tells us? **[1mark]**
 - A. if the high and low extreme scores cancel each other out.
 - B. if the mean is greater than the mode.
 - C. how well the measure of central tendency represents the entire set of scores.
 - D. whether or not to compute percentiles.

2. If I am interested in describing only the variability in my data sample, but not in making an estimate for the population variance, I should use? **[1mark]**
 - A. the population parameter.
 - B. the unbiased estimate of the variance.
 - C. the biased estimate of the variance.
 - D. the variance estimates that divides by (N-1).

3. Which of the following is used to represent a known value for the population variance? **[1mark]**
 - A. s
 - B. σ
 - C. σ^2
 - D. s^2

4. The first quartile of a series of values is: **[1mark]**
 - A. The value of the ordered series located at 75% of the number of values in the series
 - B. The numeric value for which a quarter of the series' values are lower
 - C. The numeric value for which a quarter of the series' values are higher
 - D. None of the above

5. The p-value in hypothesis testing represents which of the following: Please select the best answer of those provided below. **[1mark]**
 - A. The probability of failing to reject the null hypothesis, given the observed results
 - B. The probability that the null hypothesis is true, given the observed results
 - C. The probability that the observed results are statistically significant, given that the null hypothesis is true
 - D. The probability of observing results as extreme or more extreme than currently observed, given that the null hypothesis is true

6. Given the following set of data, what is the variance? [2.5, 6.5, 8.0, 3.0, 7.5, 9.5, 14.2, 15.0, 15.5, 16.5] **[1mark]**
 - A. 8.75
 - B. 24.28
 - C. 4.93
 - D. 5.19

Questions 7 and 8 are based on the following sample of ages (in months) of 18 children at a day care: 36, 42, 18, 32, 22, 22, 25, 29, 30, 31, 19, 24, 35, 29, 26, 36, 24, 28

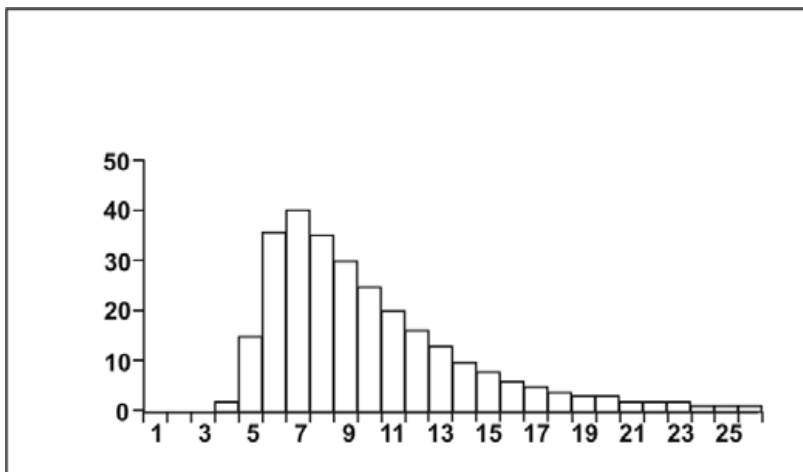
7. What is the standard deviation of the age of children? **[1mark]**
- A. 6.42
 - B. 41.44
 - C. 41.24
 - D. 6.24
8. The median age of the children is? **[1mark]**
- A. 31.5
 - B. 28.2
 - C. 30.5
 - D. 28.5
 - E. 31
9. A study was conducted into the influence of spaying of bitches on their subsequent development of urinary incontinence. Young adult bitches presenting for spaying were randomly allocated to immediate ovariohysterectomy or to a deferred operation 6 months later. The bitches were followed over the 6 months. What type of variable is 'development of urinary incontinence'? **[1mark]**
- A. Qualitative variable
 - B. Quantitative variable
 - C. Categorical variable
 - D. Binary variable
10. Your local police force wants to install cameras that can "catch" drivers who run red lights. They choose a busy intersection, install a test camera, and determine whether each car stops safely or "runs" the light. Choose the correct scale of measurement. **[1mark]**
- A. Approximately interval
 - B. Ordinal
 - C. Interval
 - D. Nominal
 - E. Ratio

Section B: Answer all the questions in this section [20marks]

1. Chemical and manufacturing plants sometimes discharge toxic-waste materials such as DDT into the nearby lake. These toxins can adversely affect the marine animals. A PhD Student pursuing a degree in medical laboratory science recently conducted a study of fish in Lake Victoria. A total of 140 fishes were sampled, and the following variables were measured for each **[4 marks]**
- a. Classify each of the five-variable measured as qualitative or quantitative
 - I. Beaches where each fish was captured
 - II. Species (Tilapia, Mudfish, Nile perch)
 - III. Length (cm)

IV. Weight (grams)

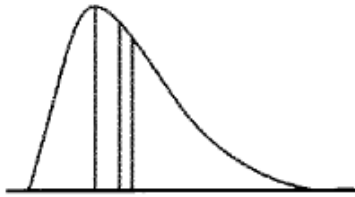
2. Which, if any, of these statements are true? you do not need to give reasons for your choice) [5 marks]
- a) Gauss curve is defined as: Symmetrical to the vertical axis, which passes through.
 - b) Categorical date is the name is given to data which can be ranked
 - c) Type I is an error made when one fails to reject the null hypothesis when it is false is:
 - d) Mean of statistics is unaffected by outliers?
 - e) The mean is, the middlemost score.
3. Use figure 3.0 to answer question 3



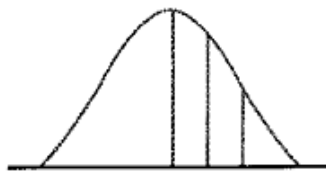
- a) What is the likely relationship between mean, median, and mode of the distribution shown in Figure 2.12? [4 marks]
4. Given the following set of data [1.1 2.1, 2.2, 2.3, 2.5, 3.3, 4.7, 5.8, 6.0, 12.7 11.9] [7 marks]
- a) Calculate the following: sample variance and sample standard deviation

Section C: Answer any two questions in this section (30 marks)

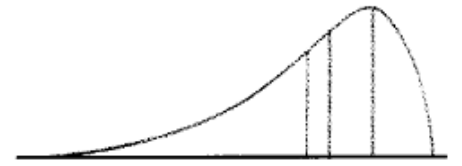
1. With three examples each, define the following terms: [15marks]
 - a. An ordinal variable
 - b. A nominal variable
 - c. Continuous Variables
- 1.
2. Briefly discuss the following terms [15 marks]
 - a) inferential and
 - b) differential statistic
3. Consider the following distributions to answer question a and b
 - a) At what point A, B, C do mean median and mode fall for each distribution? [9 marks]
 - b) Draw a box and whisker diagram for each of the three graphs [7 marks]



ABC
(i)



A B C
(ii)



A B C
(iii)