AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF MEDICAL SCIENCE
DEPARTMENT OF REHABILITATION MEDICINE
BACHELOR OF SCIENCE IN PHYSIOTHERAPY
END OF MAY-AUGUST 2024 TRIMESTER EXAMINATIONS

UNIT CODE: PHT 315   UNIT NAME: BIOSTATISTICS (MAIN EXAM)

DATE: TUESDAY/ 13TH/ AUGUST
TIME: TWO HOURS
START: 11:15AM   STOP : 1:15PM

INSTRUCTIONS (physical exams)
　　1. **Do not write on this question paper**
(Marks and questions distribution as per program curriculum.)

INSTRUCTIONS (Online examinations)

1. This exam is marked out of 70 marks
2. This Examination comprises 3 Sections
3. This online exam shall take 2 Hours
4. Late submission of the answers will not be accepted
5. Ensure your web-camera is on at all times during the examination period
6. No movement is allowed during the examination
7. Idling of your machine for 5 min or more will lead to lock out from the exam
8. The Learning Management System (LMS) has inbuilt integrity checks to detect cheating
9. Any aspect of cheating detected during and or after the exam administration will lead to nullification of your exam
10. In case you have any questions call the invigilator for this exam on Tel. 0705833434 and or the Head of Department on Tel 0720491032
11. For adverse incidences please write an email to: amiu.examinations@amref.ac.ke

SECTION A-MULTIPPLE CHOICE QUESTION (20 MARKS)

1. Pulse rate or weight of patient are known as;
   A. Nominal data
   B. Continuous data
   C. Discrete data
   D. Random variable
2. Classification of objects or persons into classes or groups in such a way that only one object or person falls in only one group at a time is called as;
   A. Mutually exclusive
   B. None Mutually exclusive
   C. Dependent
   D. Independent
3. In testing hypothesis, we use different level of significance to test Ho, in most situations level of significance is not given then we have to use;
   A. 1 %
   B. 2 %
   C. 5%
   D. 10%
4. If we want to compare two or more groups then we use coefficient of variation (C.V), the group which has maximum C.V is known as the more;
   A. Consistent
   B. Not consistent
   C. None of the above
   D. It is not possible
5. When we make a 95% confidence interval for the population mean using t or z test then probability or chance of error will be;
   A. 0.05
   B. 0.1
   C. 1
   D. 5
6. A variable which has some chance or probability of its occurrence is known as;
   A. Simple variable
   B. Qualitative variable
   C. Quantitative variable
   D. Random variable
7. The sample mean x is known as the point estimator of the population;
   A. Median
   B. Mode
   C. Variance
   D. Mean μ
8. In all research analysis it is not possible to study whole population, we always estimate population parameters on the basis of;
   A. Population information
   B. Sample information
   C. We could not estimate parameters
   D. Estimation of samples

9. Sampling is the process of drawing samples from the population, when the chance or probability of each member of the population is equal than such sampling design known as;
   A. Simple random sampling
   B. Not random sampling
   C. Judgment sampling
   D. None of these
10. When the distribution of data is skewed, one should ideally use;
    A. Mean
    B. Median
    C. Mode
    D. None of these
11. Z-core is calculated for;
    A. Chi-quire distribution
    B. Standard normal distribution
    C. T-distribution
    D. Normal distribution
12. A hospital claims, its ambulance response time is less than 10 minutes, it can be written as;
    A. oH>10 min, AH≤ 10 min
    B. oH≤10 min, AH> 10 min
    C. oH≠10 min, AH= 10 min
    D. oH- 10 min, AH/ 10 min
13. Chi-quire test of significance is used when;
    A. Data is continuous
    B. Data is categorical
    C. Data is discrete
    D. None of these
14. Parameters of standard normal distribution are;
    A. Mean
    B. SD
    C. Range
    D. Both a and b
15. Which one the following is true for standard normal distribution;
    A. Mean = 0
    B. Mean = 50
    C. Mean = 100
    D. Mean = 0.548.
16. When mean, median, and mode lie in the center of the curve, the distribution is known as;
    A. Right skewed
    B. Left skewed
    C. Chi-squire
    D. Normal
17. Which one the formula is used for df in chi-squire distribution;
    A. (row)(column)
    B. (row-column)

C. (row-1) (column-1)

D. (row-1) (column)

18. All of the following are true for measure of dispersion except;

    A. Mean

    B. Range

    C. Inter-quartile range

    D. Variance

19. What is true for descriptive statistics;

    A. Organization & displaying of data

    B. Drawing inferences for population

    C. Hypothesis testing

    D. Calculation p-value

20. The Wilcoxon signed Rank-Sum test used to compare the location of?

    A. Two populations

    B. Three Population

    C. A sample mean to the population mean

    D. Any number of populations

SECTION B –SHORT ANSWER QUESTIONS (30 MARKS) Answer all questions.

1. A sample of 20 indivituals,10 non-smokers and 10 smokers were picked using a probability sampling method and followed up for 5 years. At the end of the follow-up , they were tested and 4 of the smokers had developed lung cancer compared to two non-smokers   (6 Marks)

   a) Construct a table of observed frequency and Compute the expected frequency

                                                                                          (2 marks)

   b) Calculate the chi square test at a significance level of $\alpha = 0.05$ (4 marks)

2. A researcher wants to estimate the average height of adult males in a city. A random sample of 100 adult males is taken, and their heights are recorded. The sample has a mean height of 175 cm and a standard deviation of 10 cm.   (6 Marks)

   a) Calculate the 95% confidence interval for the true mean height of adult males in the city.   (4 Marks)

   b) Interpret the confidence interval in the context of the problem.   (2 Marks)

3. Suppose the average daily HIV related death in Kenya is 5. What is the probability that persons testing positive will be?   (6 Marks)

   a) Fewer than 4 on the next year (4 Marks)

   b) At most two on the next day   (2 marks)

4. The weight of men has a bell-shaped distribution with a mean of 69.0 kg and a standard deviation of 2.8 kg.   (6 marks)

   a) What percentage of men has weights below 65. kg   (3 Marks)

   b) What percentage of men has weights between 65.4 kg and 72.3 kg? (3 Marks)

5. A pharmaceutical company claims that its new drug reduces blood pressure by an average of 10 mmHg. A researcher believes this claim might be exaggerated and decides to test it. The researcher conducts an experiment with 50 patients and finds that the average reduction in blood pressure is 8 mmHg with a standard deviation of 5 mmHg.
   (6Marks)
   a) State the null and alternative hypotheses.   (2 Marks)
   b) Conduct a hypothesis test at the 0.05 significance level.   (2 Marks)
   c) Interpret the results.   (2 Marks)

SECTION C –LONG ANSWER QUESTIONS (20 MARKS) Choose one question

1. The following are data of weights of 12, Men undergoing drug rehabilitation.
   (20 Marks)

   18, 28, 31, 25, 29, 41, 43, 33, 36, 37, 40, 35 9
   a) Calculate the: Mean, Median, Variance and Standard deviation. (8 Marks).
   b) Calculate Q1 and Q3   (4 Marks)
   c) Construct a boxplot   (4 Marks)
   d) Plot a frequency polygon   (4 Marks)
2. The following were the systolic pressure of 18 patients attending a cardiac clinic.
   (20 Marks)
   104, 131, 127, 109, 121, 140,126, 136, 140, 122, 124, 123, 128, 114, 99, 130, 135, 143
   a) For the data above, group the systolic BP in a class width of 10 and construct a frequency table   (5Marks)
   b) Calculate the relative frequency and cumulative frequency   (6 Marks)
   c) Compute the mean, median and mode   (9 Marks)