



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY  
SCHOOL OF HEALTH SCIENCES**

**UNIVERSITY EXAMINATION FOR DEGREE OF MASTER PUBLIC HEALTH**

**1<sup>ST</sup> YEAR 1<sup>ST</sup> SEMESTER 2018/2019 ACADEMIC YEAR**

**KISUMU LEARNING CENTRE**

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| <b>COURSE CODE:</b>  | <b>HMP 5114</b>      |
| <b>COURSE TITLE:</b> | <b>BIOSTATISTICS</b> |
| <b>EXAM VENUE:</b>   | <b>STREAM:</b>       |
| <b>DATE:</b>         | <b>EXAM SESSION:</b> |
| <b>TIME:</b>         | <b>3.00 HOURS</b>    |

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**Instructions:**

- 1. Answer any four Questions (Question One is Compulsory)**
- 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.**

## **QUESTION 1 (COMPULSORY)**

### **QUESTION 1**

- a. What is the role of statistics in Epidemiology or Public health **(2 Marks)**
- b. Name three (3) examples of parametric tests **(3 Marks)**
- c. Differentiate between Normal and Binomial distribution **(1 Mark)**
- d. When do you use median as a better measure of central value **(2 Marks)**
  
- e. Assuming that the height of adult males has a normal distribution with mean 175cm and standard deviation of 10cm.
  - i. What proportion of males have height smaller than 175cm **(2 Marks)**
  - ii. What proportion of males have height above than 175cm **(2 Marks)**
  - iii. In a random sample of 1000 males, how many should have height above 185cm **(3 Marks)**

### **QUESTION 2**

- a. Describe four (4) factors affecting the choice of test statistics **(6 Marks)**
- b. Assuming that the mean and median age of women attending family planning unit of Kisumu county hospital are 25 and 37 years respectively.
  - i. Which estimate (mean or median) will you report? Explain the choice of your answer **(2 Marks)**
- c. Assume that the proportion of men in the population with diastolic blood pressure (DBP) greater than 95 mm/Hg is known to be 0.25
  - i. What is the standard error of the proportion of men with DBP greater than 95 mm/Hg **(2 Marks)**
  - ii. Calculate 99% confidence interval of men with DBP greater than 95 mm/Hg **(3 Marks)**
  - iii. Interpret the results obtained in (ii) above **(2 Marks)**

### **QUESTION 3**

- a. Differentiate between simple and compound events in probability giving one example in each case **(3 Marks)**

- b. List three (3) examples of discrete probability distributions (**3 Marks**)
- c. Name two assumptions of central limit theorem (**2 Marks**)
- d. In the sexually transmitted diseases clinic in Kisumu district hospital, Kisumu County, 20 girls were found to be infected with either gonorrhoea or Chlamydia trachonomatis or both. If 8 girls had Chlamydia trachonomatis, 8 girls gonorrhoea and 4 girls with both infections. Find the probability of a:
  - i. Girl having Chlamydia trachonomatis (**3 Marks**)
  - ii. Girl having Chlamydia trachonomatis (C.T) or gonorrhoea (**4 Marks**)

#### **QUESTION 4**

- a) The frequency distribution of patients aged between 10 to 49 years who visited a health centre in Kisumu county in the month of April, 2014 is shown in table below

| Age group | Frequency of patients |
|-----------|-----------------------|
| 10-14     | 5                     |
| 15-19     | 6                     |
| 20-24     | 7                     |
| 25-29     | 10                    |
| 30-34     | 5                     |
| 35-39     | 3                     |
| 40-44     | 4                     |
| 45-49     | 8                     |

- i. Present this data using a appropriate graph (**3 Marks**)
- ii. What is the width of the intervals (**2 Marks**)
- iii. Calculate the mean, median, mode and standard deviation (**10 Marks**)

#### **QUESTION 5**

- a. Define standard error (**2 Marks**)
- b. Differentiate between Ch-square and Student T test (**2 Marks**)
- c. A survey was carried out in a large sub-county in Kisumu to compare weight for age for boys and girls aged between 9 to 15 years. A random sample of 143 girls and 127 boys were included in the survey, 25 % of the girls and 14 % of the boys were falling below 70% of the standard weight for age and sex.
  - i. Summarize this data in a contingency table (**2 Marks**)
  - ii. Perform the appropriate test statistics (**7 Marks**)
  - iii. Interpret results obtained in (ii) above (**2 Marks**)

### **QUESTION 6**

- a. When do we use non-parametric tests **(2 Marks)**
- b. Name two sources of variation in experimental units **(2 Marks)**
- c. A study was carried out to compare the average diastolic blood pressure of 3 groups of patients who have been under high blood pressure medication. The first group received diuretic, the second group received beta-blockers and the third group received placebo treatment as shown in the table below:

| Diuretic | Beta-blockers | Placebo |
|----------|---------------|---------|
| 127      | 143           | 154     |
| 98       | 119           | 185     |
| 153      | 173           | 146     |
| 131      | 162           | 159     |
| 125      | 125           | 168     |
|          | 108           | 134     |
|          | 116           |         |
|          | 127           |         |

- i. State the null hypothesis **(1 Marks)**
- ii. Construct analysis of variance table **(8 Marks)**
- iii. Is there significant effect of three treatments on blood pressure **(2 Marks)**