

**JARAMOGI OGIGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF HEALTH SCIENCES
MPH EXAMINATION**

**END SEMESTER EXAMINATION
HMP 5114: BIostatistics**

April 2014

TIME ALLOWED: 2 hours 30 minutes.

Note: Answer question one and any other three questions

QUESTION 1 (COMPULSORY)

- a) Why do we need Statistics in public health (**2 Mark**)
- b) Differentiate between Discrete and continuous probability distribution giving two (2) examples in each case (**4 Marks**)
- c) Distinguish between:
 - i. Scale of measurement and purpose of variable (**2 Marks**)
 - ii. Chi-square and Student t-test (**2 Marks**)
 - iii. Parametric and Non- parametric test (**2 Marks**)
 - iv. Bar graph and histogram (**2 Marks**)

QUESTION 2

- a) List three (3) ways of summarizing qualitative data (**3 Marks**)
- b) Why is probability important in public health (**2 Marks**)
- c) State two (2) important rules in probability calculation (**2 Marks**)
- d) Differentiate between outcome and event (**2 Marks**)
- e) In the sexually transmitted diseases clinic in Kisii level-five hospital, 10 girls were found to be infected with either gonorrhoea or chlamydia trachomatis or both. If four girls had chlamydia trachomatis, 4 girls gonorrhoea and 2 girls with both infections. Find the probability that:

- i. A girl has gonorrhoea (2 Marks)
- ii. A girl has both gonorrhoea and chlamydia trachonomatis (4 Marks)

QUESTION 3

- a. Define P-value (2 Marks)
- b. State three (3) properties of central limit theorem (3 Marks)
- c. List two (2) types of errors in decision making (2 Marks)
- d. The mean score on knowledge of the adverse effects of a group of 81 primary health care physicians with less than 10 years experience to the diagnosis of depression was 35.94, with standard deviation of 4.60. If the mean score on knowledge of 64 primary care physicians with more than 10 years experience was 39.8, with standard deviation of 4.05.
 - i. Test if the difference in knowledge of the diagnosis of depression is statistically significant (6 Marks)
 - ii. What interpretation can you give based on the observed result (2 Marks)

QUESTION 4

- a. List three (3) examples of parametric test (3 Marks)

The following are the age (years) at onset of a chronic disease recorded in 50 patients in Kisii level-five hospital in 2010:

54	45	58	49	47	50	55	40	46	41
46	44	55	58	49	53	49	45	42	49
52	51	47	58	41	45	53	53	47	51
46	48	52	56	47	48	44	55	57	54
42	58	49	53	52	54	59	42	58	44

Applying the STRUGES' rule:

- b. what is the number of intervals (1 Mark)

- c. What is the width of the intervals (1 Mark)
- d. Construct a frequency distribution table (3 Marks)
- e. Calculate the mean, median, mode and standard deviation (7 Marks)

QUESTION 5

- a. State three (3) assumption of normal distribution (3 Marks)
- b. Differentiate between Standard deviation and standard error (2 Marks)
- c. Define the power of a test (2 Marks)
- d. If 20% possess the sickle trait out of population of 5-year old school children. What is:
 - i. The standard error of the proportion of sickle cell patients in repeated sample of 150 from this population of school children (3 Marks)
 - ii. The 95% confidence interval in repeated sample of 150 from this population of school children (3 Marks)
 - iii. Comment on the confidence interval obtained above (2 Marks)

QUESTION 6

- a. List three (3) reasons why analysis of variance is important (3 Marks)
- b. Name two sources of variation in the experimental results (2 Marks)
- c. In a study of the impact of smoking on general cardiovascular fitness, six non-smokers, six light smokers, six moderate smokers, and six heavy smokers were subjected to a period of sustained physical exercise. After three minutes rest their heart rates were measured. The results are as presented below:

Non smokers	Light smokers	Moderate smokers	Heavy smokers
69	55	67	92
52	60	77	73
71	78	81	87
58	58	70	68
59	62	57	96
65	66	79	85

- i. State the null hypothesis (2 Marks)
- ii. Construct analysis of variance table (6 Marks)
- iii. Is there significant effect of level of smoking on the heart rate (2 Marks)