



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF HEALTH SCIENCES

UNIVERSITY EXAMINATION FOR DEGREE OF BACHELOR OF SCIENCE

(PUBLIC HEALTH AND COMMUNITY HEALTH & DEVELOPMENT)

4th YEAR 1ST SEMESTER 2017/2018 ACADEMIC YEAR

REGULAR (MAIN)

COURSE CODE: HPD 3415

COURSE TITLE: BIostatISTICS II

EXAM VENUE:

STREAM:

DATE:

EXAM SESSION:

TIME: 2.00 HOURS

Instructions:

- 1. Answer question 1 (Compulsory) and ANY other 2 questions**
- 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 ONE (Compulsory):

a) Explain the following terms as used in Biostatistics

- i) Sample
- ii) Population
- iii) Statistical inference
- iv) Correlation
- v) Discrete random variables
- vi) Confidence interval

(12mks)

b) Explain 4 characteristics of a good estimator of a parameter of a population. (8mks)

c) On a group of anaemic patients, an iron preparation was administered and the haemoglobin levels of the patients before and after therapy were noted and are given below. Find out whether there is a significant change in the haemoglobin level of the group after the therapy.

Patient No.	HB level in gm%	
	Before therapy	After therapy
1	5.6	10.2
2	4.8	9.4
3	6.5	11.0
4	7.5	7.5
5	4.5	7.5
6	3.5	6.0
7	6.7	8.0
8	6.2	9.6
9	5.6	10.0
10	4.4	8.4
11	7.5	8.0
12	8.0	8.0

(10mks)

QUESTION TWO:

- a) Differentiate between point estimate and interval estimate (2mks)
b) Given a random sample of size 10 from a population of infants whose birthweights (oz) are as follows:

97 125 62 120 132 135 118 137 126 118

Compute a 95% confidence interval for the mean birthweight. (18mks)

QUESTION THREE:

- a) Explain what is meant by correlation (1mk)
b) Given a digoxin clinical trial data for 10 participants in terms of age and serum creatinine;

Age	55	78	50	60	31	70	46	59	68	65
Creatinine serum	1.600	2.682	1.300	1.091	1.159	1.250	1.307	1.705	1.534	2.00

Calculate Pearson correlation coefficient. What type of relationship is this? (5mks)

- c) Suppose as part of a program of counseling patients with many risk factors of heart disease, 100 smokers are identified. Of this group, 10 give up smoking for at least one month. After 1 year follow up 6 of the 10 patients are found to have taken up smoking again. Derive the 95% confidence interval for the ex-smokers. (5mks)

- d) i) Explain why the confidence interval for population variance (σ^2) is not symmetrical about sample variance (s^2) while for population mean (μ) it is symmetrical about the sample mean (\bar{x}). (4mks)

ii) An experimenter wanted to check the variability of audio-source. 3 independent measurements recorded by an equipment gave; 4.1, 5.2 and 10.3. Given that sample variance is 7.3, estimate the population variance with 90% confidence interval. (5mks)

QUESTION FOUR:

A medical researcher wanted to find out if a newly developed syrum was effective in curing a certain disease. He took two groups of patients A and B with 100 patients each. The two groups were suffering from the same disease and were accorded the same treatment. In addition, group

A was given the syrum while group B did not get the syrum(the control group). After one week of treatment, 75 patients from group A got cured while 65 of group B got cured. At level of significant

i) $\alpha = 0.01$

ii) $\alpha = 0.05$

iii) $\alpha = 0.1$

a) Find out if the syrum helped cure the disease.

The results were not good enough for this researcher(he was dissatisfied). He took larger samples of patients with 300 patients each. They were accorded the same treatment but group C got the syrum while group D did not get the syrum.

b) Using the above level of significance, find out if the syrum helped cure the disease.

c) Are the two set of conclusion different? (20mks)

QUESTION FIVE:

A study is made to compare the nicotine content of two brands of cigarretes A and B. 10 cigarretes of brand A are found to have an average nicotine content of 23.1 mg with the standard deviation of 1.5mg. Similarly 8 cigarretes of brand B have an average nicotine content of 22.7mg with the standard deviation of 1.7mg. Smoker K claims that there is no significant difference in the nicotine content in the two cigarretes while smoker W claims that the nicotine is higher in brand A than in B. At level of significance 0.05 test which of these smokers tells the truth. (20mks)