



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF HEALTH SCIENCES
UNIVERSITY EXAMINATION FOR BACHELOR OF SCIENCE IN COMMUNITY
HEALTH AND DEVELOPMENT
4TH YEAR 1ST SEMESTER 2015/2016 ACADEMIC YEAR
KISUMU LEARNING CENTRE

COURSE CODE: SBI 3415

COURSE TITLE: BIostatISTICS II

EXAM VENUE: STREAM: (BSc Comm Hlth & Dev)

DATE: EXAM SESSION: 2.00-4.00PM

TIME: 2.00 HOURS

Instructions:

- 1. Answer all the questions in Section A and ANY other 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 (30 marks)

QUESTION 1 (COMPULSORY)

- a. What is the meaning of level of statistical error (2 Marks)
- b. When do we use a t-distribution instead of normal distribution during analysis (2 Marks)
- c. Distinguish between:
 - i. Paired T-test and ordinary T-test (2 Marks)
 - ii. P-value and confidence interval (2 Marks)
 - iii. Simple and multiple linear regression (2 Marks)
 - iv. Correlation and regression (2 Marks)
- d. Briefly describe four (4) factors affecting the choice of test statistics (6 Marks)
- e. List four (4) examples of non-parametric tests (4 Marks)
- f. Ten measurements of a certain blood component are made by two instruments on 10 samples and the following results are obtained

Sample No.	1	2	3	4	5	6	7	8	9	10
1 st instrument:	10	9	10	11	8	9	7	8	9	9
2 nd instrument:	10	11	9	10	9	11	12	8	10	10

 - i. Assess whether there is significant difference in the two measurements (8 Marks)

SECTION B

Answer any TWO Questions

QUESTION 2

- a. State four (4) main reasons why researchers prefer to carryout research on selected individuals rather than the entire population (4 Marks)
- b. Define standard error (3 Marks)
- c. As part of a childhood anaemia survey in a large, dispersed, rural community in Kenya, the mean haemoglobin (Hb) level of all children under 6 years is estimated. In order to save time and cut cost, the Hb level was measured only in a random sample of 50 children under the age of 6 years. In this random sample, the mean Hb level and its standard deviation are 12.2 g/100ml and 1.8g/100ml respectively.
 - i. Can we use the results obtained from the random sample to make inference about the Hb level in the whole community? (1 Mark)
 - ii. Give reason to your answer in (i) above (2 Marks)

- iii. Based on the results obtained from the random sample, calculate the standard error **(3 Marks)**
- iv. Calculate the 99 % confidence interval **(4 Marks)**
- v. Interpret results obtained in (iv) above **(2 Marks)**

QUESTION 3

- a. The table below shows the results of a survey in a rural area in Kenya on prevalence of infection with Schistosoma Mansoni among different occupations.

Schistosoma Mansoni	Occupation			
	Fishermen	Farmers	Traders	Craftsmen
Positive	22	21	17	15
Negative	13	22	41	14

- i. What the prevalence of Schistosoma Mansoni in the rural area **(2 Marks)**
- ii. Name the test statistics you would use to analyze this data **(1 Mark)**
- iii. Give reason for your choice of test statistics **(2 Marks)**
- iv. State the null hypothesis **(2 Marks)**
- v. Assess whether prevalence of Schistosoma Mansoni infection are statistically significantly different in the 4 occupations **(8 Marks)**

QUESTION 4

- a. Name three key elements in experimental study design **(3 Marks)**
- b. A study comparing the average diastolic blood pressure of 3 groups of patients who have been under high blood pressure medication. The first group received diuretic medicament, the second group received beta-blockers and the third group received Placebo treatment. If the data were as follows:

Group 1 (Diuretic)	Group 2 (Beta-blockers)	Group 3 (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 **(2 Marks)**

- ii. What statistical test would you use to analyze this data (1 Mark)
- iii. Construct analysis of variance table (9 Marks)
- iv. Determine if there is significant difference between the 3 groups (5 Marks)

QUESTION 5

- a. Define Pearson’s correlation coefficient (1 Mark)
- b. A researcher examines the relationship between systolic pressure, age and weight on 30 individuals. The data were analyzed with the following results

Source	SS	df	MS	
				Number of obs = 30
Model	7370.28	?	?	F (2, 27) =?
Residual	?	?	?	Prob > F = 0.025
				R-squared =?
Total	8166.67	?	?	

Variable	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
Age	-0.080	0.294	-0.272	0.788	?
Weight	0.819	0.064	12.856	0.000	?
Constant	19.353	6.755	2.865	0.008	?

- i. Describe the relationship between blood pressure and age (1.5 marks)
- ii. Write down the equation that has been fitted to the data (2 Marks)
- iii. What is the blood pressure of a boy age 9 years weighing 45 kg (2 Marks)
- iv. Is the relationship statistically significant? Justify your answer (2 Marks)
- v. Complete the Analysis of Variance table (11.5 Marks)