JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF HEALTH SCIENCES

UNIVERSITY EXAMINATION FOR MASTER OF SCIENCE IN COMMUNITY HEALTH/PUBLIC HEALTH DEVELOPMENT

COURSE CODE:	**HMP 5114**	**DATE:15/1/25**
COURSE TITLE:	**(BIOSTATICS)**	**EXAM SESSION:9-12.00 NOON**
TIME:	**3.00 HOURS**	

Instructions:

1. Answer question ONE (Compulsory) and any other two.
2. Candidates are advised to write in the question paper.
3. Candidates must hand in their answer booklets to the invigilator while in the exam room.

Q1a) what is the role of statistics in Epidemiology or public health? (3mks)

b) Distinguish between Type 1 and Type II errors in research (2mks)

From a random sample of 36 nurses, the mean age and the sample standard deviation were found to be 40 years and 4.5 years respectively. Construct 95% confidence interval for the mean age of the nurses. (4mks)

c) Briefly explain when we use t-test and not z-test (2mks)

d) State 3 examples of parametric tests (3mks)

e) Identify situations when to use Poisson distribution and not binomial distribution (2mks)

f) List 4 types of Regression Analysis

Q2) Analyze the given data to determine whether there is sufficient evidence to conclude the health outcome is associated with whether one is vaccinated or not

HEALTH OUTCOME	Not vaccinated	Vaccinated
Sick with pneumococcal pneumonia	43	6
Sick with non-pneumococcal pneumonia	92	17
Stayed healthy	61	77

(20mks)

Q3) The following relates to pairs of seedlings of the same age produced by cross pollination and the other self-pollination, growing together so that numbers of each pair are reared under nearly same condition. The data are the final height of each plant after a fixed period of time. The question is whether cross fertilized reach a higher final height than self-pollinated plants.

Cross fertilized	23.5	12	21	22	19.1	21.5	20.4	18.3	21.6	23.3	21	22.1	22.1	23	12
Self fertilized	17.4	20.4	20	20	18.4	18.6	15.3	16.5	18	16.3	18	12.8	12.8	115.5	18
Difference	6.1	-8.4	2	1	0.7	3.5	5.1	1.8	3.6	7	3	9.3	7.5	7.5	-6

Descriptive statistics

	N	Mean	Std Deviation
Cross fertilized	15	20.1933	3.61613
Self fertilized	15	17.5867	2.03816
Difference	15	2.6067	4.71282
Valid N(Listwise)	15		

Required

a) Test hypothesis (Null) that cross fertilized and self-fertilized plants reach on average the same final height (5mks)

b) Give a 90% confidence interval for mean difference in final height (15mks)

Q4a) James and Mercy measured cholesterol level among 20 patients and captured the following data.

240, 243, 250, 254, 264, 279, 284, 285, 290, 298, 302, 310, 312, 315, 322, 337, 345, 384, 386, 320.

Determine whether the mean cholesterol level in the sample is significantly different from the level 220 m//dl recommended by many physicians. (10 mks)

b)

	Person correlation	(Sig 2tailed)	Lower	Upper
Age - %Body fat	.792	<0.01	.516	.919
Age- Weight	.053	.835	.424	.507
%Body fat-weight	.030	.906	.443	.490

Estimation is based on Fishers r- to z transformation

Required: Confidence interval for correlation coefficient at 95% confidence intervals for Body fat- age (n=18)

Q5a) A Msc Biostatistics student on attachment in a healthy facility sought to determine the association between consumption of foodstuff and the resultant body mass of

Student	1	2	3	4	5	6
Calories of food	40	58	28	62	22	50
Body mass	70	88	50	92	45	80

Required:

a)Pearson correlation coefficient indicating the relationship between the 2 variables(12mks)

b) Interpret the results (3mks)

c) Determine the error of the coefficient(5mks)

6) Using the data below from 10 MSC Epidemiology students

Student code	1A	2B	3C	4D	5E	6F	7G	8H	9I	10J
Height(y)	159	157	147	169	172	161	159	154	178	149
Weight(x)	61	69	77	67	74	67	59	55	71	62

Required:

i) Regression equation showing the relationship (15mks)

ii) Interpret the regression line(3mks)

iii) Use the equation to predict the height of a student when the weight is 80 (2mks)