



KENYATTA UNIVERSITY
EXAMINATION FOR THE DEGREE OF MASTER OF SCIENCE IN MEDICAL
LABORATORY SCIENCE

HSU 854: EPIDEMIOLOGY

1ST SEMESTER 2022/2023

TIME: 2 Hours

INSTRUCTIONS:

- **Answer any THREE of the following four Questions**

1. a) Use the information on the table to answer the questions below. The 1st table shows the total number of persons who ate each of specified food items that were possibly infective with group A streptococci. The 2nd table shows the number of sick persons who ate each of the various specified combinations of the food items

Table 1

Total number of persons who ate each specified Combination of Food items		
	Ate Tuna	Did not eat Tuna
Ate egg salad	75	100
Did not eat egg salad	200	50

Table 2

Total number of persons who ate each specified Combination of Food items and who later became sick (Acute sore throats)		
	Ate Tuna	Did not eat Tuna
Ate egg salad	60	75
Did not eat egg salad	70	15

- i. Compute the attack rate (2 Marks)
- ii. According to the results shown in the preceding tables, which of the following food items or combination is most likely to be infective? (2 Marks)

b) Zubeda an epidemiologist conducted a prevalence survey from January through December 31st, 2003, identified 1000 cases of schizophrenia in her town which had 2 million people. The incidence rate of schizophrenia in this population is 5 per 100000 persons each year. What percentage of the 1000 cases were newly diagnosed in 2003?

(4 marks)

c) At an initial examination in a certain research centre, mass migraine headache was found in 5 of 1000 men aged 30-35 years and in 10 of 1000 women aged 30-35 years. The inference that women have a two times greater risk of developing migraine headache than do men in this age group. Is this true or false, justify your answer (6 marks).

d) Investigating an outbreak may be primarily deductive or inductive or a combination of both. Discuss in details in details the steps commonly used in investigating an acute outbreak (16 marks).

2. a) Establishing causation is not a process that relies solely on statistics, but mainly on applied logic and common sense and is derived from noticing associations. This observed association may be causative, or it may be due to chance or to error. As a consultant in epidemiology, You have been assigned a role of describing guidelines that should be considered when deciding whether an association is causative. Discuss (16 marks).

b) Several methods are available to control for confounding either through study design or during the analysis of results. Discuss the methods used to control for confoundings in

i. the design of an epidemiologic study (8 marks)

ii. at analysis stage (6 marks)

3. a) A colon cancer screening study was being carried is being conducted in Maganyakulo area. Individuals 50-75 years old were screened with the Hemocult test. In this test , a stool sample was tested for presence of blood. The hemocult test had a sensitivity of 70% and a specificity of 75%. If the prevalence of co;on cance in Maganyakulo is 12/1000 for colon cancer, establish

i. the positive predictive value of the test (6 marks)

ii. the negative predictive value of the test (6 marks)

iii. the results interpret in (a) above. (2 marks)

	Drug a	Drug b	Combination (a+)
Cured	170		250
Not Cured		470	

Using chi-square test, test the hypothesis that the drugs are equally effective in the treatment.

Given 95% confidence. Degree of freedom=2

(12 marks)

- c) The following data set shows ages of patients admitted with breast cancer in Kayabombo breast cancer hospital during a certain month.

10, 22, 24, 42, 37, 77, 89, 85, 25, 63, 9, 10, 7, 51, 2, 1, 52, 7, 48, 54, 32, 29, 2, 15, 46, 48, 39, 6, 72, 14, 36, 69, 40, 61, 12, 21, 54, 53, 58, 32, 27, 33, 1, 25, 22, 6, 81, 11, 56, 5, 63, 53, 88, 48, 52, 87, 71, 51, 52, 33, 46, 33, 85, 22, 5, 8, 28, 2, 85, 61, 16, 42, 69, 7, 10, 53, 33, 3, 85, 8, 51, 60, 58, 9, 14, 74, 24, 87, 7, 81, 30, 76, 7, 6, 27, 18, 17, 53, 70 and 49.

- i. Using Sturges rule to obtain the class interval and the class width, Construct a frequency distribution table.

(8 marks)

- ii. Compute the median and the mean considering it's a continuous grouped data.

(4 marks)

4. a) Wisdom et al conducted a review of 20 subjects to establish the relationship between age and EEG (Electroencephalogram) between ages 20-60 year. He wishes to establish if EEG output is correlated to age. The data of age and EEG output value for 20 subjects was as shown below

Subject Number	Age	EEG Output
1.	20	98
2.	21	75
3.	22	95
4.	24	100
5.	27	99
6.	30	65
7.	31	64
8.	33	70
9.	35	85
10.	38	74
11.	40	68
12.	42	66
13.	44	71

14.	46	62
15.	48	69
16.	51	54
17.	53	63
18.	55	52
19.	58	67
20.	60	55

- i. Draw a scatter plot for the data (5 marks)
 - ii. Use the data to calculate the Spearman's Rank Correlation Coefficient (5 marks)
 - iii. Hence, find the Karl Pearson's Correlation Coefficient r (5 marks)
 - iv. Determine regression equation (5 marks)
- b) Abdalla observed the diastolic blood pressure of 12 women before and after recruitment into a contraceptive plan and presented their results in the table below

S.No Diastolic blood pressure at entry Diastolic blood pressure after recruitment

1	70	85
2	63	77
3	90	83
4	85	85
5	59	72
6	68	95
7	62	89
8	69	87
9	72	102
10	79	92
11	83	91
12	85	76

Perform an appropriate statistical test on the above data to show if there was significant change in the blood pressure. Tabulated value(TV)= $t_{0.05(n-2)}$. (10 marks)