



THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

MAIN EXAMINATION

MAY – JULY 2016 TRIMESTER

FACULTY OF EDUCATION

DEPARTMENT OF UNDERGRADUATE STUDIES IN EDUCATION

HOLIDAY PROGRAMME

ED 501: FUNDAMENTALS OF EDUCATIONAL STATISTICS

Date: JULY 2016

Duration: 3 Hours

INSTRUCTIONS: Answer any FOUR Questions

Q1. The following data was obtained from speed performance of class in completing tasks in physics (X) and mathematics (Y) in minutes

X	Y	XY	X ²	Y ²
5	5			
10	20			
6	4			
8	15			
4	11			
4	9			
3	12			
10	18			
2	7			
6	2			
7	14			
9	17			
$\sum X$ 74	$\sum Y$ 134	$\sum XY$ —	$\sum X^2$ —	$\sum Y^2$ —

a) Calculate XY, X² and Y²

(3 marks)

b) Sum columns XY, X² and Y²

(2.5 marks)

c) Calculate Pearson product-moment coefficient (r)

(7 marks)

d) Calculate degrees of freedom

- e) Determine whether there is a correlation between the speed in performing physics and mathematics tasks **(5 marks)**

Q2. Use the following grouped data to answer questions 2 (a) to

Class interval	Frequency (f)	Midpoint (X^1)	fX	$X - \bar{X}$	$(X - \bar{X})^2$	F $(X^1 - \bar{X})^2$
12.0 – 12.9	1					
13.0 – 13.9	0					
14.0 – 15.9	1					
15.0 – 15.9	1					
16.0 – 16.9	4					
17.0 – 17.9	6					
18.0 – 18.9	8					
19.0 – 19.9	3					
20.0 – 20.9	3					
21.0 – 21.9	1					
22.0 – 22.9	1					
23.0 – 23.9	1					
	$\sum f = 30$		$\sum fX$		$\sum f(x - \bar{x})^2$	

- a) Calculate the midpoints (X) FX, $(x - \bar{x})^2$ and $f(x^1 - \bar{x})^2$ **(3 marks)**
- b) Determine $\sum fX$ and $\sum f(x - \bar{x})^2$ **(2.5 marks)**
- c) What is the mean for the grouped data. **(5 marks)**
- d) What is the standard deviation for the grouped data. **(5 marks)**
- e) Explain the deviation of scores from each other and from the mean. **(2 marks)**

- Q3. Two groups of students were asked to rate their liking for lime juice on a scale of 1 – 10, 10 being total liking and 1 being least liking. Their responses were listed as follows

Group A		Group B	
X	X ²	Y	Y ²
1		4	
4		5	
3		5	
5		6	
2		2	
3		7	
5		6	
6		9	
2		5	
4	—	$\sum Y =$	$\sum Y^2 =$
$\sum X =$			

- Square each score in X and Y **(3 marks)**
 - Sum columns X, X² Y and Y² **(2.5 marks)**
 - Calculate the t-ratio **(5 marks)**
 - Calculate the degrees of freedom and find the p value. **(5 marks)**
 - Is there a significant mean difference in the two groups liking lime juice? **(2 marks)**
- Q4. A drug company is interested in investigating whether the colour of their packaging has any impact on sales. To test this, they used five different colours (blue, green, orange, red and yellow) for the boxes of an over-the-counter pain reliever, instead of their traditional white box. The following table shows the number of boxes of each colour sold during the first month.
- | Box colour | Blue | Green | Orange | Red | White |
|----------------------|------|-------|--------|-----|-------|
| Number of boxes sold | 310 | 292 | 280 | 216 | 296 |
- Using the 0.01 significance level, conduct a chi-square to test the null hypothesis that the number of boxes sold of each of these five colours is the same. **(17.5 marks)**
- Q5. Analyze in detail the steps followed in hypothesis testing **(17.5 marks)**
- Q6. Justify the great significance attached to the study of statistics by educational practitioners. **(17.5 marks)**

Formulae

$$t = \frac{MX - MY}{\sqrt{\left[\frac{\left(\sum X^2 - \frac{(\sum X)^2}{NX} \right) + \left(\sum Y^2 - \frac{(\sum Y)^2}{NY} \right)}{NX + NY - 2} \right]}} \cdot \left[\frac{1}{NX} + \frac{1}{NY} \right]$$

Where

\sum = sum of the following scores

MX = Mean for group A

MY = Mean for group B

X = Score in group 1

Y = Score in group 2

NX = Number of scores in group 1

NY = Number of scores in group 2

END