

UNIVERSITY EXAMINATIONS

1ST SEMESTER 2022/2023 ACADEMIC YEAR

FOURTH YEAR EXAMINATION FOR THE DEGREE
BACHELOR OF ARTS IN CRIMINOLOGY AND
SECURITY STUDIES

CRSS 412: SOCIAL STATISTICS II

STREAM: R

TIME: 2 HRS

DAY: THURS [14.30 – 16.30]

DATE: 08/12/2022

THIS QUESTION PAPER CONSISTS OF FOUR (4) PAGES

PLEASE DO NOT OPEN UNTIL THE INVIGILATOR SAYS SO.

INSTRUCTIONS

- i) *Do Not Write anything on this question paper*
- ii) *Answer Question one (30mks) and any other Two Questions (20mks each)*

QUESTION ONE

(a) Differentiate between the following variables as used in statistics. (6 Marks)

- (i) Independent and dependent variables
- (ii) Discrete and continuous variables
- (iii) Nominal and ordinal variables

(b) Explain how statistics can be abused by ‘researchers’. (2 Marks)

(c) Given that percentage increase of sales over three-year period of a certain company is given by 25%, 30% and 40%. Calculate the geometric mean of the sales increase.

(2 Marks)

(d) The data below shows how students scored in a statistics class:

Score	20–29	30–39	40–49	50–59	60–69	70–79	80–89	90–99
Frequency	4	16	14	20	18	16	6	2

- (i) Calculate the mean (4 Marks)
- (ii) Estimate the median using linear interpolation method. (6 Marks)
- (iii)

(e) A statistician drew a sample of 300 individuals whom he asked to indicate their political preference: UDA, ODM and OKA and whether they approve or disapprove of any major change of the Kenyan constitution. The frequency data was tabulated and placed in the appropriate cells of the table. The pollster intends to know whether the proportions of UDA, ODM, or OKA who favour the major change of constitution differ significantly, indicating a relationship between political preference and attitude towards the change of constitution.

Table 1 Response to questions with expected values

Political preference	Approve		Disapprove		Total	
	Observed	Expected	Observed	Expected	Observed	Expected
UDA	120		100		220	
ODM	80		90		170	
OKA	130		180		310	
Total						

(i) Copy the table and fill in the blank spaces for each cell. Show your working.

(5 marks)

(ii) By using formula, $X^2 = \frac{\Sigma(fo - fe)^2}{fe}$ compute Chi-square (X^2) value for the data.

(3 marks)

Use the attached Chi-square table to test your hypothesis at 5% significance level, and make conclusion for the data

(2 marks)

QUESTION TWO

(a) Find out the harmonic mean of 2, 4 and 8

(10 marks)

(b) Use the data below to answer the questions that follow:

75	79	56	42	80	58	73	94	77	60
28	37	67	55	87	39	55	70	73	81
75	67	73	46	53	69	68	82	84	70
52	55	29	78	64	37	81	76	74	63
59	63	81	77	66	58	63	60	71	82

Use a range starting 20 – 29 to construct a table to enable to calculate:

(i) The variance

(8 Marks)

(ii) Standard deviation

(2 Marks)

QUESTION THREE

Calculate median for the monthly wages for 143 workers in Menengai refinery oil limited for the data given below.

Monthly Wages (sh.)	No. of Workers
800-1,000	18
1,000-1,200	25
1,200-1,400	30
1,400-1,600	34
1,600-1,800	26
1,800-2,000	10
Total	143

(10 Marks)

Distinguish between:

- (i) One-tail and two-tail hypothesis test. (3 marks)
- (ii) Type I error and Type II error. (3 marks)
- (iii) Level of significance and critical region. (4 marks)

QUESTION FOUR

- (a) The following are marks obtained by ten students in two tests. Calculate Spearman's rank correlation coefficient between the marks of the two tests

(10 marks)

students	A	B	C	D	E	F	G	H	U	J
Test I	70	68	67	55	60	60	75	63	60	72
Test II	65	65	80	60	68	58	75	63	60	70

- a. The data below was the weight (in kgs) for the fourth year criminology students in Laikipia university collected in the year 2022.

53.00 39.00 35.00 40.00 43.60 68.00 66.00 24.00 27.00 21.00 16.00 19.40
 20.50 45.00 36.00 26.00 32.00 44.00 39.40 50.50 51.00 30.50 60.30 49.00
 39.50 65.00 69.00 50.20 50.50 24.00 56.00 23.00 18.00 19.50 22.00 20.40
 20.60 19.30 17.00 50.90 52.00 55.00 60.10 60.30 60.40 60.50 60.90 69.50
 69.80 70.00 72.00 49.50 50.40 50.50 60.46 29.40 30.43 40.48 56.00 40.37

Prepare a tally table and determine modal class and mean mass of the patients. (10 marks)

QUESTION FIVE

- (a) Calculate the kurtosis from the following data:

Class interval	50-60	60-70	70-80	80-90	90-100
Frequency	5	12	20	7	6

(10 marks)

- (b) Discuss the importance and limitations of using statistics in data analysis.

(10 marks)