THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

MAIN EXAMINATION

JANUARY – APRIL 2022

FACULTY OF ARTS AND SOCIAL SCIENCES

DEPARTMENT OF SOCIAL SCIENCES & DEVELOPMENT STUDIES

REGULAR/ODEL PROGRAMME

SDS 311/BIR 308/SSO 303: STATISTICAL TECHNIQUES/ADVANCED STATISTICS

Date: APRIL 2022	Duration: 2 Hours
INSTRUCTIONS: Answer Question ONE and any Other TWO Questions	

Q1.   A) The following grades were obtained by students in the social statistics class;

59, 65, 61, 62, 53, 55, 60, 70, 64, 56, 58, 58, 62, 62, 68, 65, 56, 59, 68, 61, 67

Calculate;

i.	The range	**(1 mark)**
ii.	The mode	**(1 mark)**
iii.	The interquartile range	**(5 marks)**
iv.	The standard deviation	**(8 marks)**
v.	The coefficient of variation	**(2 marks)**
vi.	The median	**(1 mark)**

B) A researcher collected a sample of 2,500 with an average self-esteem score of 28 and a standard deviation of 8. Construct 95% and 99% confidence intervals. Use z= 1.96 and z=2.58 for 95% and 99% CIs respectively **(6 marks)**

C) According to a survey, the average Kenyan household is expected to spend KES 868 on holiday-related expenses during the Christmas period 2020. This amount covers only decorations. Assume the study was based on n = 94 randomly sampled households throughout Kenya. Assume that the sample standard deviation was KES 162. What is the 95% confidence interval estimate of the population mean amount- to-be-spent μ during the same period? (Note that Z=1.96 to reflect the 95% confidence level.) **(6 marks)**

Q2.   Suppose the National Transportation Safety Authority (NTSA) wants to examine the safety of cars, vans, and buses. It collects a sample of three for each of the treatments (vehicle types). Using the hypothetical data provided below, test whether the mean pressure applied to the driver's head during a crash test is equal for each type of vehicle. Use α= 0.05   **(20 marks)**

Cars	Vans	Buses
643	469	484
655	427	456
702	525	402

Q3.   The table below contains class interval data for student scores in statistics class.

Class Interval	Frequency
54– 58	2
59 – 63	5
64 – 68	8
69– 73	0
74 – 78	4
79 – 83	5
84 - 89	1

Compute, to one decimal place, the:

I.	Mean	**(3 marks)**
II.	Mode	**(4 marks)**
III.	Median	**(4 marks)**
IV.	Standard deviation	**(7 marks)**
V.	Coefficient of Variation	**(2 marks)**

Q4.   A). A random sample of 395 people were surveyed and each person was asked to report the highest education level they obtained. The data that resulted from the survey is summarized in the following table:

	High School	Bachelors	Masters	Ph.D.	Total
Female	60	54	46	41	201

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	High School	Bachelors	Masters	Ph.D.	Total
Male	40	44	53	57	194
Total	100	98	99	98	395

Are gender and education level dependent at 5% level of significance? **(20 marks)**

Q5. In a study of diagnostic processes, entering clinical graduate students are shown a 20-minute videotape of children's behaviour and asked to rank-order 10 behavioural events on the tape in the order of the importance each has for a behavioural assessment. (1 = most important.) The data are then averaged to produce an average rank ordering for the entire class. The same thing was then done using experienced clinicians. The data is as follows:

Events:	1	2	3	4	5	6	7	8	9	10
ExperiencedClinicians :	1	3	2	7	5	4	8	6	9	10
New Students:	2	4	1	6	5	3	10	8	7	9

Use Spearman's Γs to measure the agreement between experienced and novice clinicians (new students) (20mrks).

END

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