AFRICA UNIVERSITY
(A United Methodist-Related Institution)

"Investing in Africa's Future"

COLLEGE OF BUSINESS, PEACE, LEADERSHIP, AND GOVERNANCE

NMMS 202: QUANTITATIVE ANALYSIS 1

END OF SECOND SEMESTER EXAMINATION

MAY 2023

DURATION: 3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Answer **all** questions in Section A and **any three (3)** questions in Section B**.**
2. The marks allocated to **each** question are shown at the end of the question.
3. Candidates are allowed to use a non-programmable calculator.
4. Start **each** question on a new page in your answer booklet.

SECTION A: ANSWER ALL QUESTIONS

QUESTION ONE

Answer True/False (T/F) (Each question carries 2 marks)

1. The correlation coefficient can take values between 0 and 1.
2. A regression line can be written in the following form: $y = a + b$.
3. Type II Error: Accepting Null Hypothesis when Null Hypothesis is true.
4. A sample is known as the entire group of individuals to be studied.
5. Mode is the process when the smallest and largest values are dropped prior to finding the mean.
6. Given a survey of 2,500 traders, it was found that 1,500 of them expected an increase of a stock market index. Based on this sample, the point estimate is 1500.
7. Values of the chi-square statistic are always negative.
8. Chi-Square Distribution is symmetric.
9. The conventional dictum that correlation implies causation means that correlation can be validly used to infer a causal relationship between the variables.
10. If $p = 0.25$ and $n = 1000$, considering the binomial probability distribution, the standard deviation is 1000*0.25.
11. The Chi-square test only tells us whether two variables are independent, it does not say anything about the magnitude of the dependency if one is found to exist.
12. As the number of degrees of freedom increases, the chi-square distribution becomes more nearly symmetric.
13. The shape of the chi-square distribution depends on the degrees of freedom, just like Student's t-distribution and as the number of degrees of freedom increases, the chi-square distribution becomes more nearly symmetric.
14. Dependent samples are often referred to as matched pairs. It is possible for an individual to be matched against him or herself.
15. A sampling method is independent when the individuals selected for one sample do not dictate which individuals are to be in a second sample.
16. If the p-value is smaller than 0.05 $p < 0.05$ then H0 can be rejected.

17. Given a survey of 1,000 investment companies, it was found that 700 invest in derivatives. Based on this sample, the point estimate is 700/1000.
18. The p-value is the probability, assuming that H0 is true, of observing a value for the test statistic that is as extreme as or more extreme than the value actually observed.
19. The sampled values are independent of each other for a hypothesis test for a population mean with sigma known.
20. The sample is obtained using simple random sampling or from a randomized experiment for a hypothesis test for a population mean with sigma known.

[40 marks]

SECTION B: ANSWER ANY THREE (3) QUESTIONS

QUESTION TWO

a) Discuss the main methods of data collection. (6 marks)

b) What is the difference between descriptive statistics and inferential statistics? (4 marks)

c) Describe three scenarios in which the chi-squared test can be used in statistical analysis. (6 marks)

d) Describe two sources of data. (4 marks)

[20 marks]

QUESTION THREE

List and explain the different types of sampling methods that can be used in inferential statistics.

[20 marks]

QUESTION FOUR

a) Define the following terms;

i) Data cleaning (2 marks)

ii) Data quality (2 marks)

iii) Interval data (2 marks)

iv) Data relevancy (2 marks)

b) Explain three factors that influence data quality. (6 marks)

c) Explain the differences between a bar chart and a histogram. (6 marks)

[20 marks]

QUESTION FIVE

a) Explain the measures of dispersion (4 marks)

b) Describe the measures of central tendency (6 marks)

c) Discuss the hypothesis testing process. (10 marks)

[20 marks]

END OF EXAMINATION